FOUNDRY

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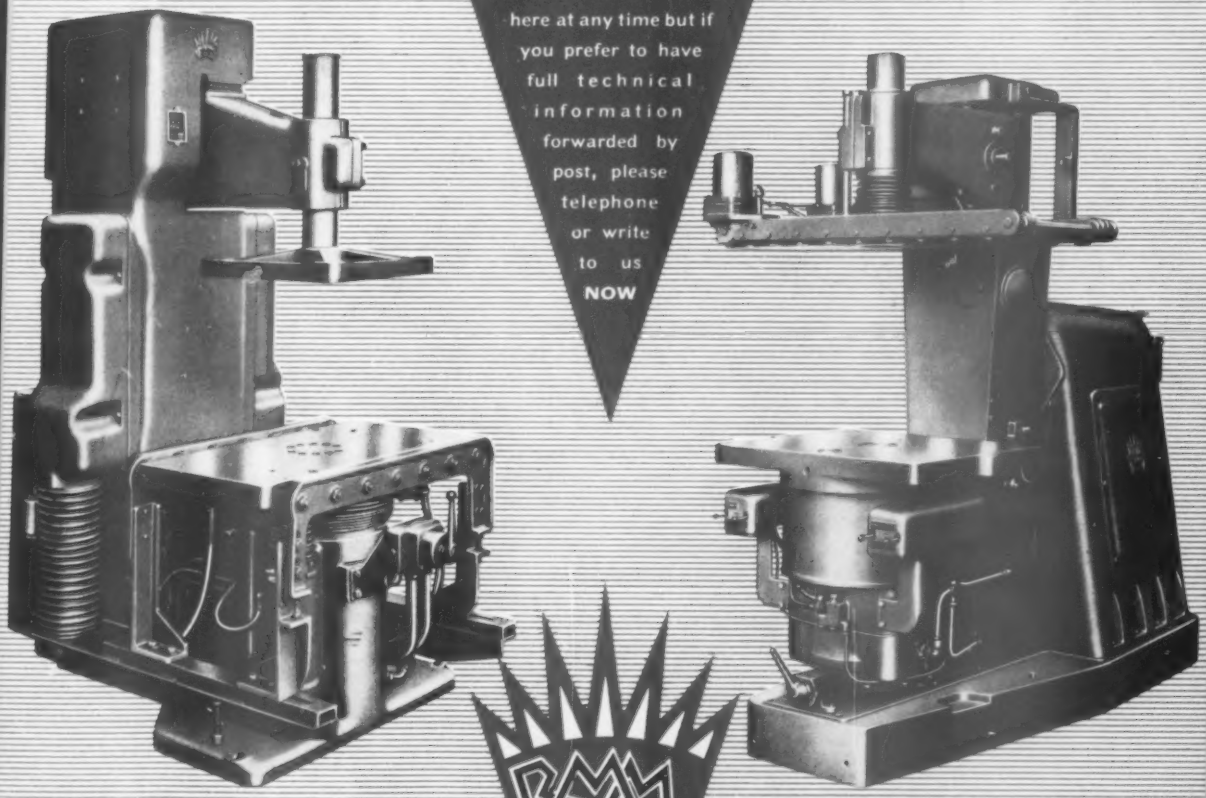

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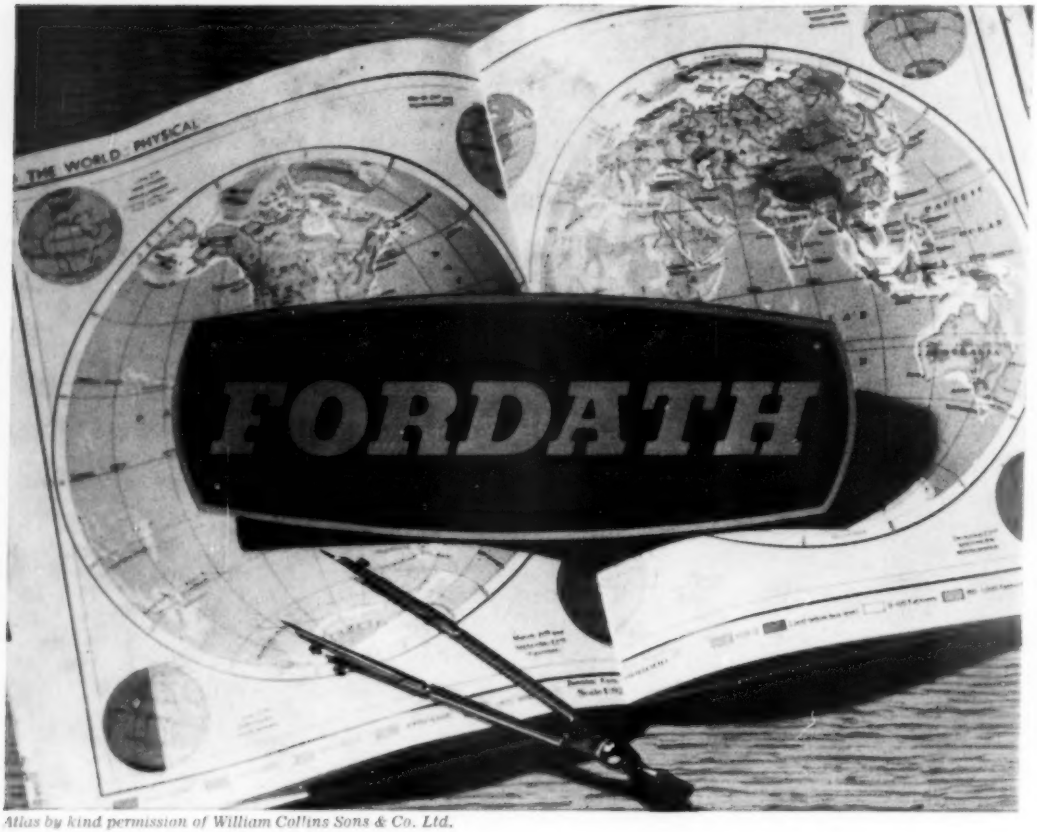

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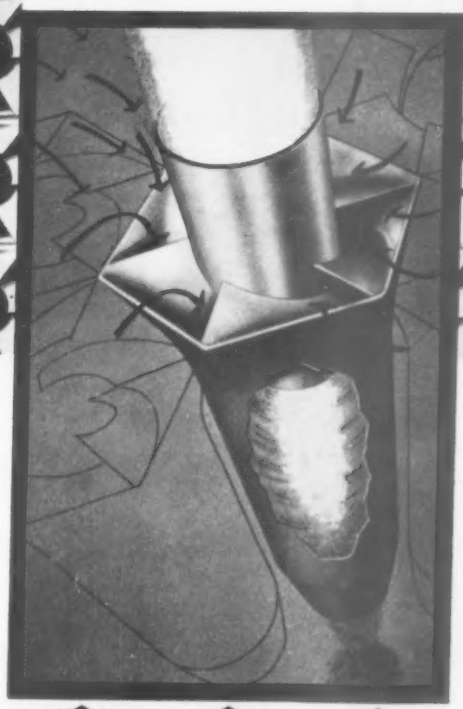

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STEEL–A RECORD YEAR

Biggest-ever output flows from Britain's busy furnaces

BRITAIN'S steel production in 1960 was the greatest ever recorded: over 24 million ingot tons. Output was running close to capacity in almost every section of the industry. Total production was *twenty per cent* above 1959.

Britain's capacity to produce steel has been increasing by leaps and bounds as a result of the £900 million which has been spent on three great development programmes. Last year alone the steel industry spent £130 million on development, *one-sixth* of all the money spent by manufacturing industry on capital investment in this country.

In the next four years the industry has already planned to spend another £450 million, and to raise its production potential by nearly one-third.

Another article on the opposite page describes a great new development in Scotland, which brings with it the promise of greater prosperity across the Border. Also in hand is a vast project near Newport, Monmouthshire. This is the Spencer works of Richard Thomas & Baldwins, which when completed will be Europe's most modern integrated steelworks. An enormous green-field site has been laid out, and work is going ahead at a tremendous pace.

Expansion under way

Three more new mills to roll improved and more efficient sections for building and constructional work will come into operation shortly at Colvilles, South Durham and the United Steel Companies.

Among the very large schemes announced in 1960 were the Tinsley Park scheme of the English Steel Corporation to increase their output of alloy and special steels, costing £26 million; the United Steel Companies' plans at Appleby-Frodingham and Samuel Fox, costing £32½ million; a Dorman Long plan costing £36 million; and the entirely new works at Rotherham of the Park Gate Iron and Steel Company which will cost £55-60 million.

Prospects for '61

What are the prospects for 1961? The industry will be able to improve on the 1960 record figure. Capacity in 1960 was nearly 26 million tons – this year it will be 27 million tons. All the time, the industry is expanding to meet future demand. This expansion is geared, not to any yearly fluctuations in our manufacturing activity, but to the steadily rising curve. It is in the confidence that this curve *will* go on steadily rising, that the many far-reaching development plans in steel are being pressed forward without slackening.

Exports a record too

Besides the enormous amount of steel which Britain exported last year in the form of manufactured goods, the steel industry's own direct exports of steel were booming.

Over 4 million ingot tons, valued at some £230 million, went into direct exports of steel in 1960 – a post-war record.

Latest available figures show that well over one-third of this went to Commonwealth countries: exports to the Commonwealth were 20% up on 1959 in tonnage. Tonnage of exports to Western Europe showed a similar upsurge. Exports to the Soviet Bloc including China, though small by comparison with total exports, also showed an increase.

Two new steels for supersonic flight

What will the supersonic airliner of the future be made from? Opinions are divided, but the Bristol T.188 research plane, which has been built to explore the problem of flight at speeds of the order of 1,800 m.p.h., is made from heat-resistant stainless steel to withstand the high temperatures caused by the friction of the air at such speeds.

The steel scientists of Sheffield have produced two new types of steel from the experience of the Bristol T.188. Although heat-resisting alloy steels had already been in use in jet engines for many years, these were not suitable for making large thin sheets of the kind required to build an airframe. The new steels produced in Sheffield are capable of being made in large sheets, and can be "worked" into the complicated shapes required.

New bridges hang on steel

The new road bridge over the Firth of Forth is being anchored into the solid rock with specially thick steel cables. They are 1¾ in. in diameter and have a breaking load of more than 350 tons. Over a thousand of these cables, enclosed in groups of four in 4½ in. diameter steel tubes, are embedded 240 feet into the rock. Other similar cables are being used to support the 110 ft. high towers until the main steel suspension cables are in position.

Other new bridges using steel suspension cables are planned over the Wye and Severn. Altogether some 70,000 tons of steel will go into the three bridges.

STEEL–THE YEARS AHEAD

New strip mill promises brighter future for thousands *BY MARGARET STEWART*

THERE is no problem of mass unemployment in Britain today as there was before the war. But there are still black spots. Scotland has 72,000 jobless, 3.3% of all its workers. In Greenock and Port Glasgow the proportion is as high as 8.1%. The national average is 1.6%.

New light industry has brought 50,000 jobs to the Clyde valley since the war. But Scotland is still over-dependent on heavy industry.

The steel industry is playing a vital part in redressing the balance, and bringing hope of an industrial renaissance. Colvilles, one of the leading British producers, are going ahead with ambitious plans to raise their steel-making capacity from 2·3 to 3·3 million tons a year. Their most important and imaginative project will produce 500,000 tons of steel sheet and 175,000 tons of light plates a year. It is in two parts – a hot strip mill at Ravenscraig and a cold reduction mill at Gartcosh, 8 miles away.

This is a completely new development for Scottish industry, traditionally a user of heavy steel. The Scots hope that plentiful supplies of sheet steel will attract manufacturers of cars, car accessories, refrigerators, washing machines, cookers, and office furniture. A canning industry could follow. Rootes and the British Motor Corporation have already decided to go north.

Snowball effect

Sir Andrew McCance, chairman of Colvilles, told me: "But for the strip mill, these motor car firms would not have elected to come to Scotland. They will bring a lot of ancillary trades, and the cumulative effect is bound to be substantial."

Mr. John Lang, steel union leader, chairman of the Scottish Board for Industry, and treasurer of the Scottish TUC, said there had been many encouraging enquiries.

The Government's decision to lend Colvilles £50 million for Ravenscraig caused controversy in Parliament. Labour spokesmen said it was wrong to use public money for the benefit of shareholders. Conservative back-bench MPs attacked the loan as "bastard socialism".

But the Scot-in-the-Street was spoken for by Mr. Lang: "We don't care a damn where the money comes from, so long as our men don't have to walk the streets looking for jobs."

Plans are going ahead in spite of the recession in the car industry. What extra employment will result? Perhaps another 1,500-2,000 steel workers will be needed. The car developments should provide upwards of 10,000 jobs directly. The Pressed Steel Company is expanding its plant near Paisley to produce bodies for cars and commercial vehicles. A new development by the accessory firm of Rubery Owen, scheduled for Bathgate, will mean work initially for about 200. And there will be a "snowball" effect from these developments within the next few years.

MARTIN: "A dandy layout"

100% success

It was stimulating to visit the Ravenscraig and Gartcosh sites. The men on the job impart their own infectious enthusiasm.

William Banks, general manager of Ravenscraig, has watched its progress for three years. "I have a great deal of faith in the future of the steel industry, and of our company in particular," he said. "I believe we shall have 100 per cent success."

More steel-making capacity is being installed to supply the new mill. Ravenscraig will be one of the first large plants in this country to adopt the "L.D.-A.C." process, one of the most modern and economic methods of making steel, using oxygen and lime.

About two-thirds of the output of the hot strip mill will be sent to Gartcosh to be cold-rolled into high quality sheet.

There is a strong reason for building at Gartcosh. Nine hundred men work there in the old hand mills of Smith and McLean. Their livelihood depends on steel.

Progress at Gartcosh, as at Ravenscraig, is well up to schedule. George Martin, the "boss", told me that American experts to whom he showed the plans had commented, "That's a dandy layout."

At first 500 men will be employed, rising to 1,000. Most of Smith and McLean's men will be found work. "We will go out of our way to place them in suitable jobs," I was told.

The two men who will manage the hot and cold strip mills are both in their early thirties. James Watson, manager-designate of the hot strip mill at Ravenscraig, is 34. His opposite number at Gartcosh, James Easton, is 31. Both have been through Colvilles' 'sandwich' courses at the Glasgow Royal College of Science and Technology. Both are brimful of confidence in themselves, their industry and the future of Scotland.

WATSON: "Finest thing that ever happened"

Says Watson: "This is the finest thing that has ever happened to me." Says Easton: "The prospects couldn't be better."

The articles on these two pages form part of an advertisement published in the Press by the British Iron and Steel Federation

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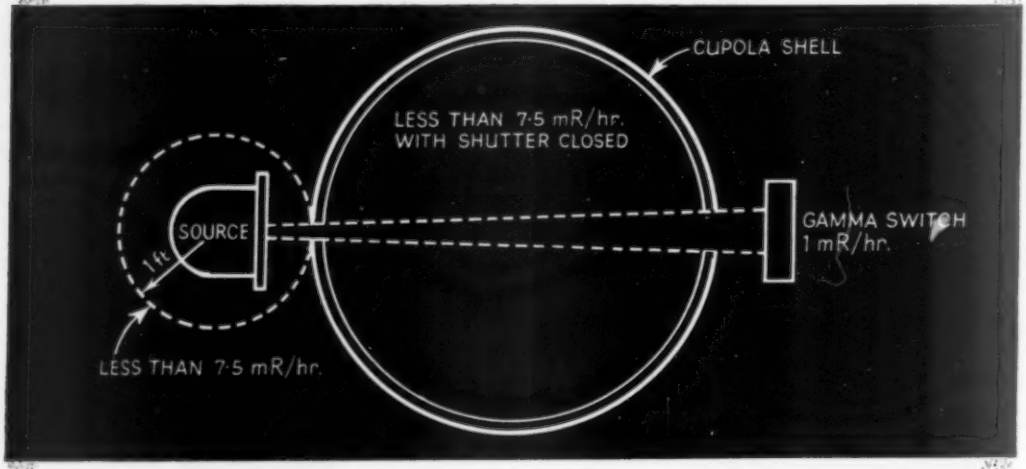

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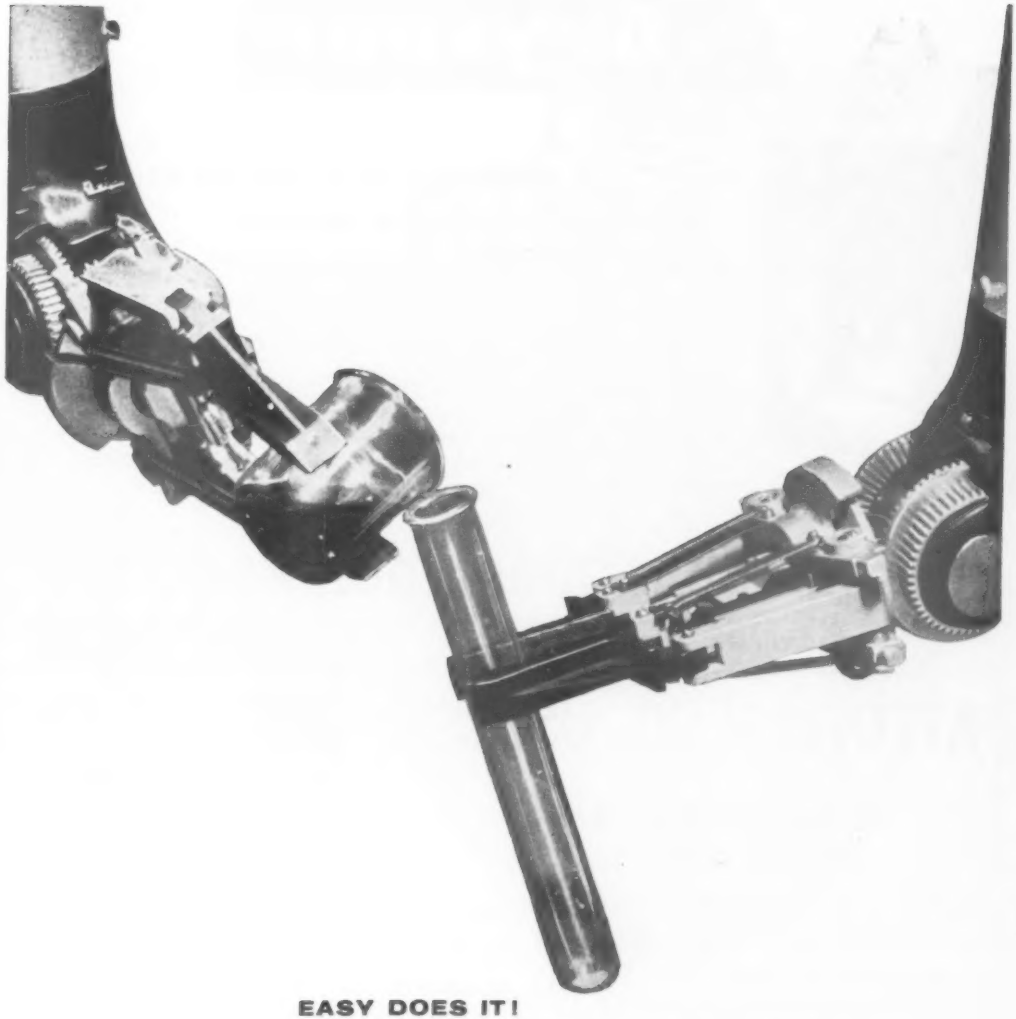

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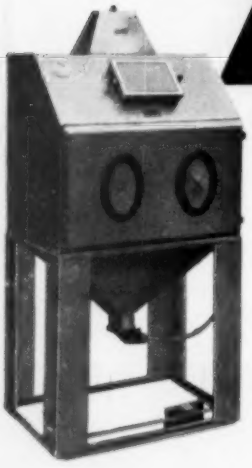

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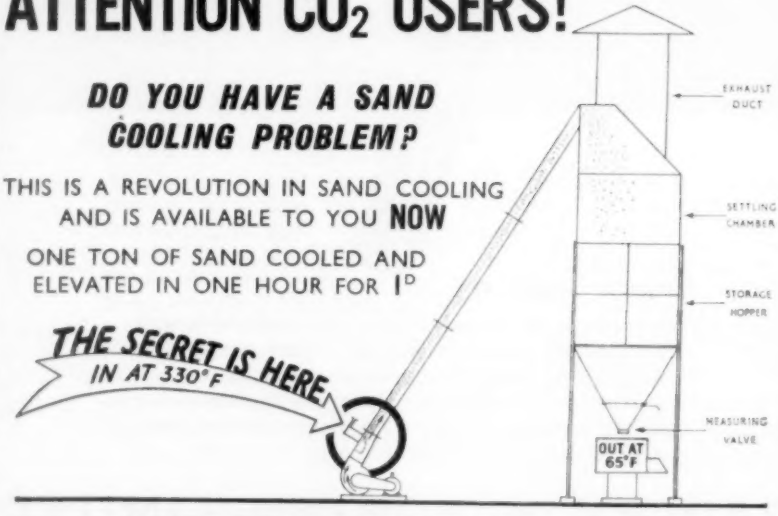

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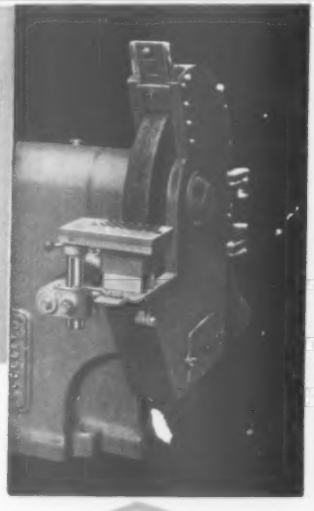

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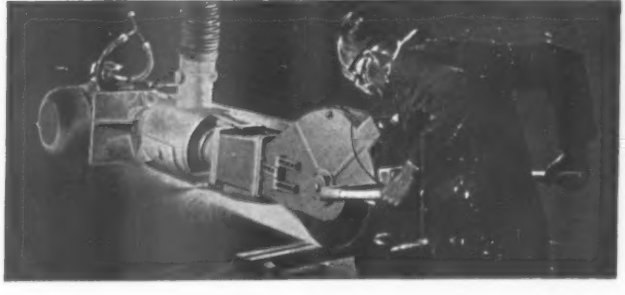

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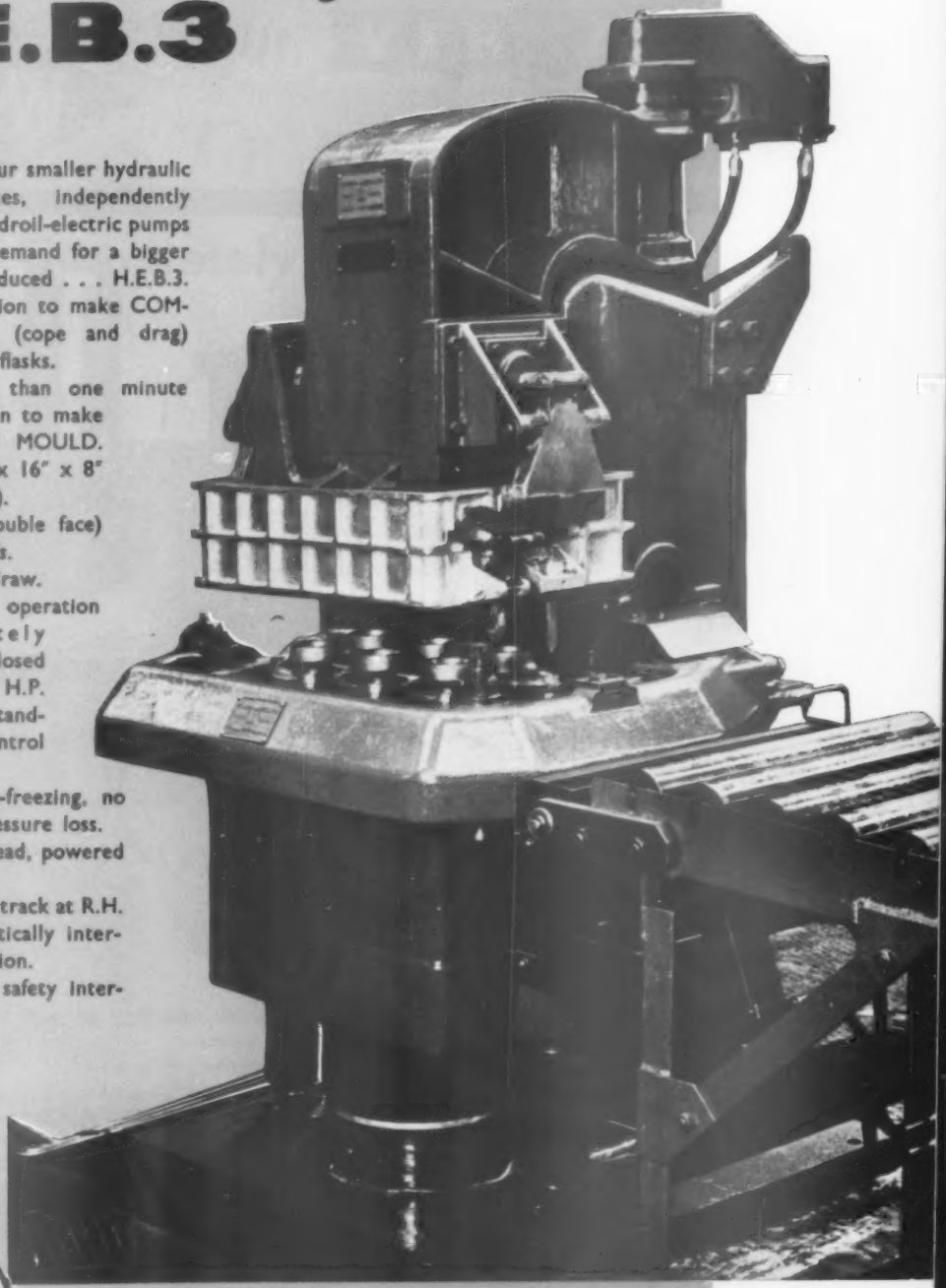

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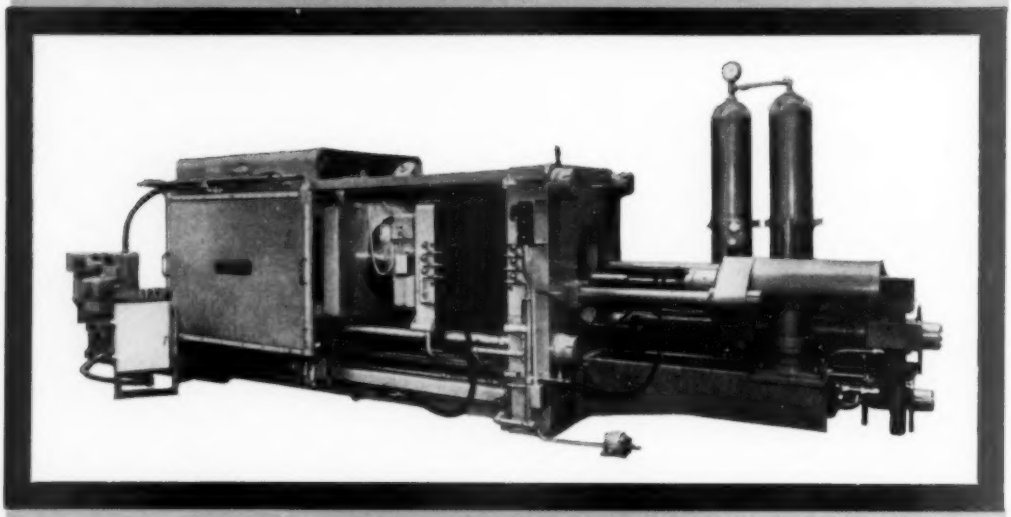

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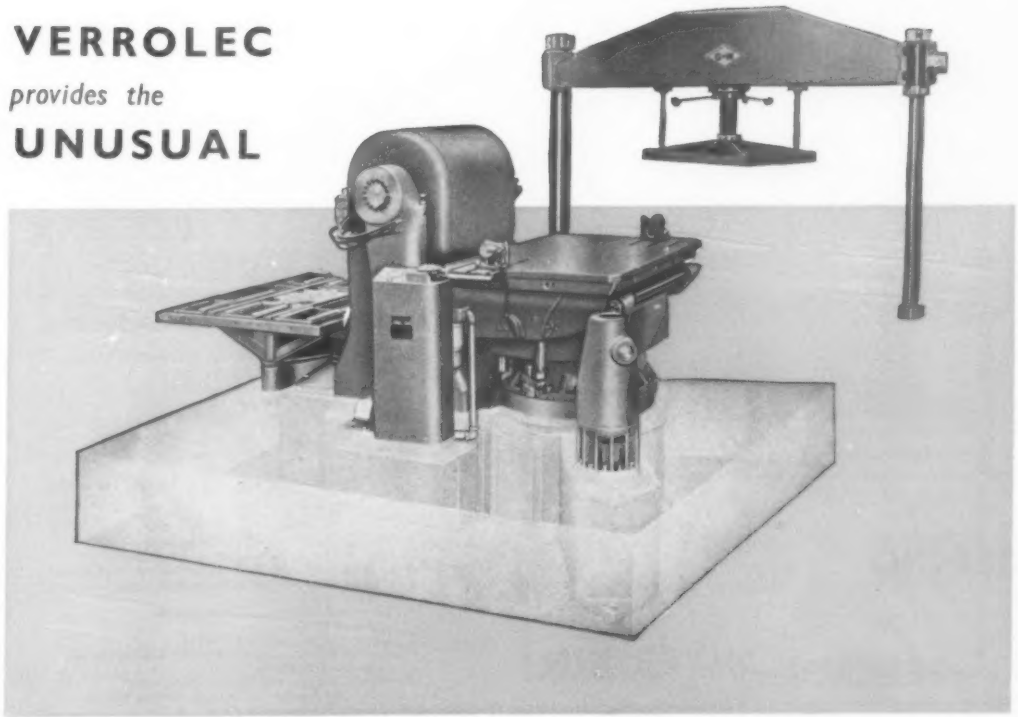

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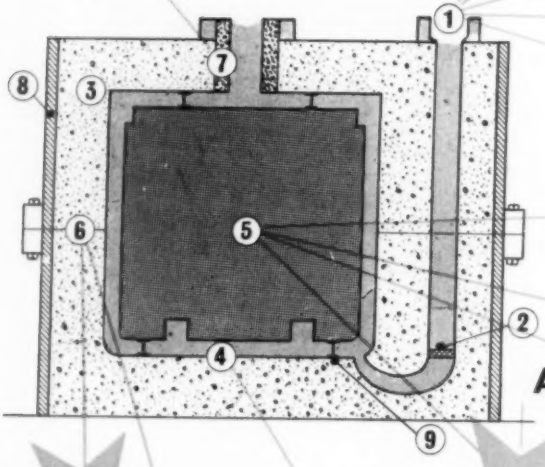

Key to Sectional Drawing of Mould

		Send for booklet No
1	Metallurgical Control use of Fluxes	3
2	Clean Metal by using Ceramic Strainer Cores and Discs.	4
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5	Cores using Crulin and Crudol Core Binders (Oil Bonded, Air Setting Cereal or CO_2 Binders).	2
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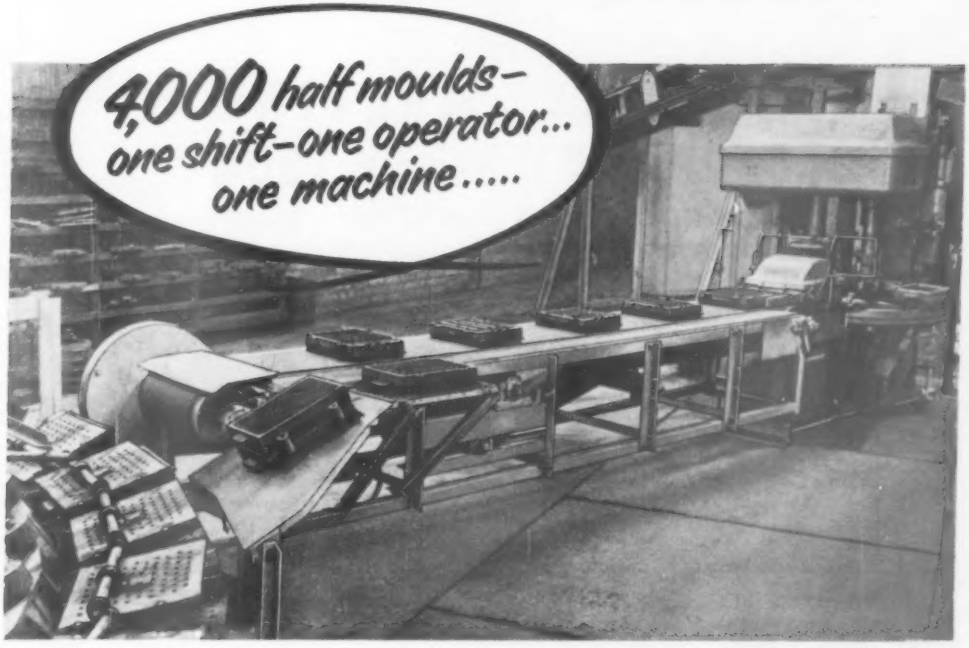

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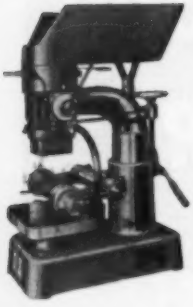

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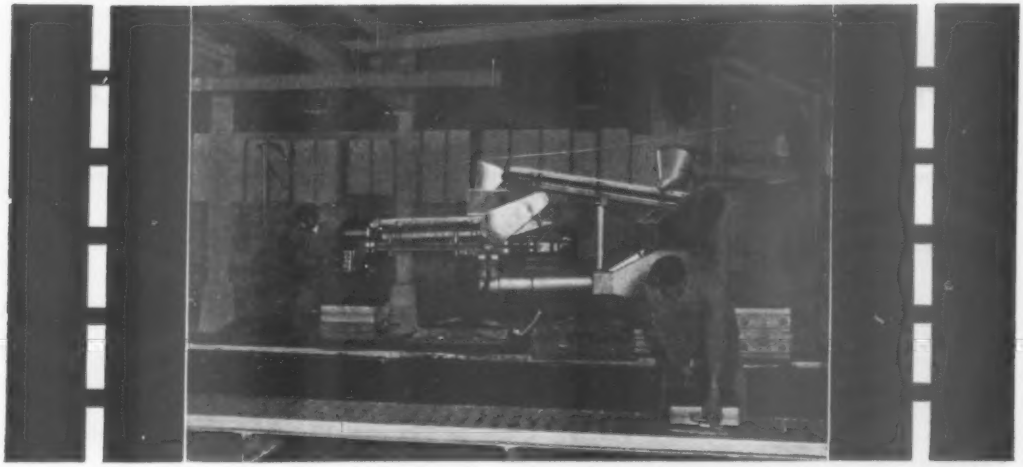

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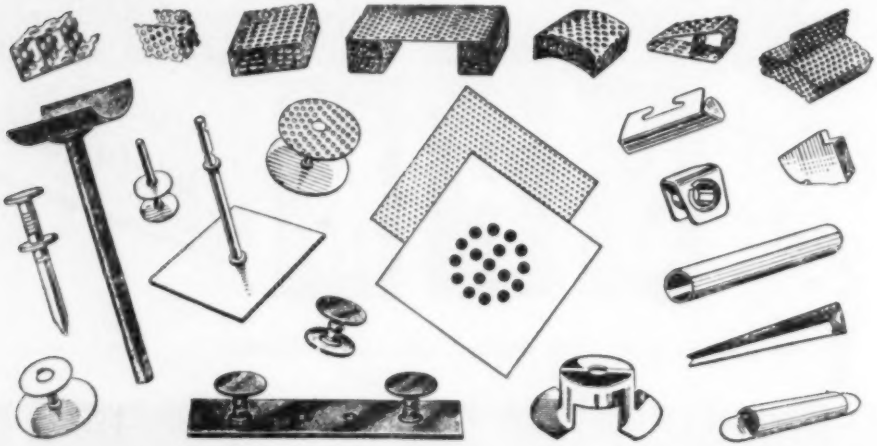

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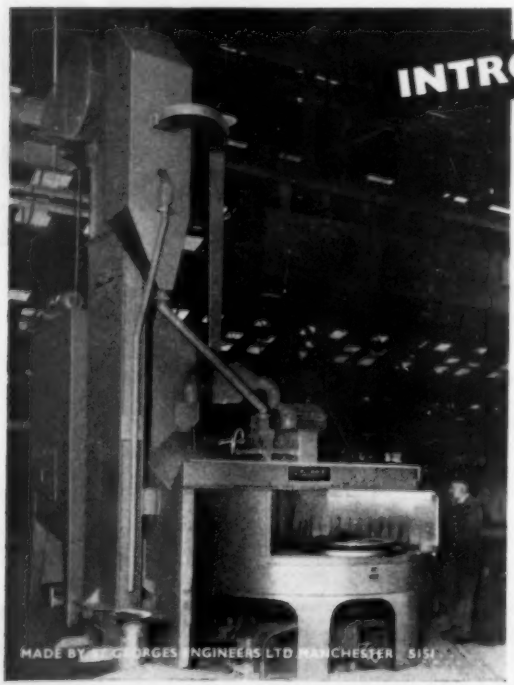

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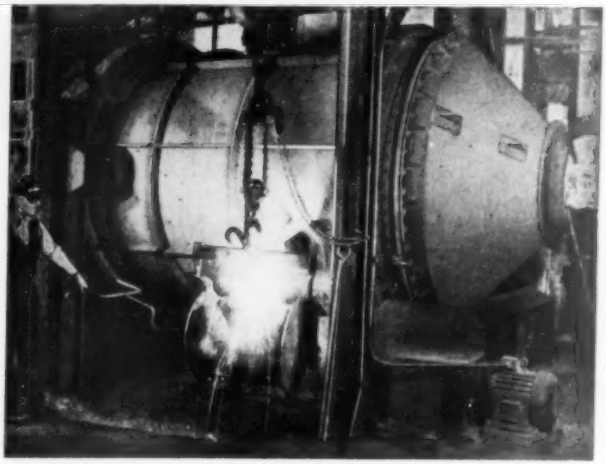

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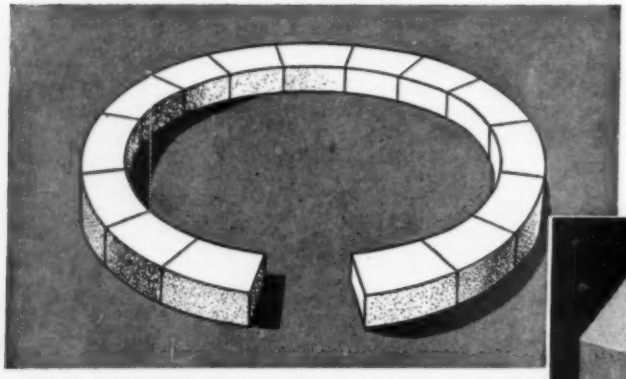

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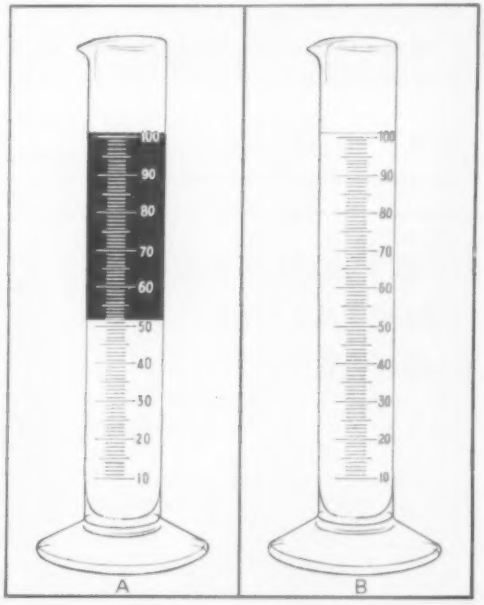

Diagrams here illustrated are taken from actual photographs
Diagram A shows a conventional competitive Zircon Cream after 2 hours
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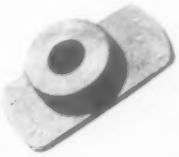

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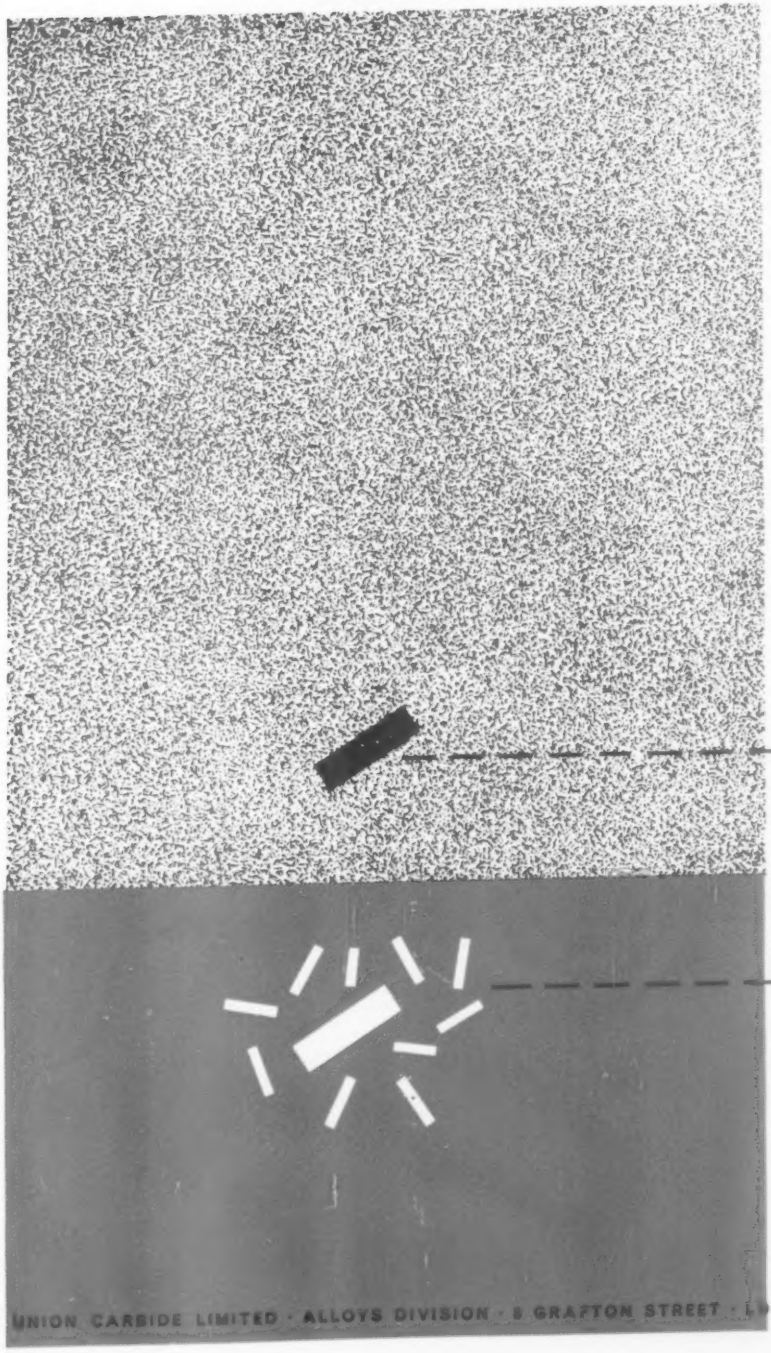

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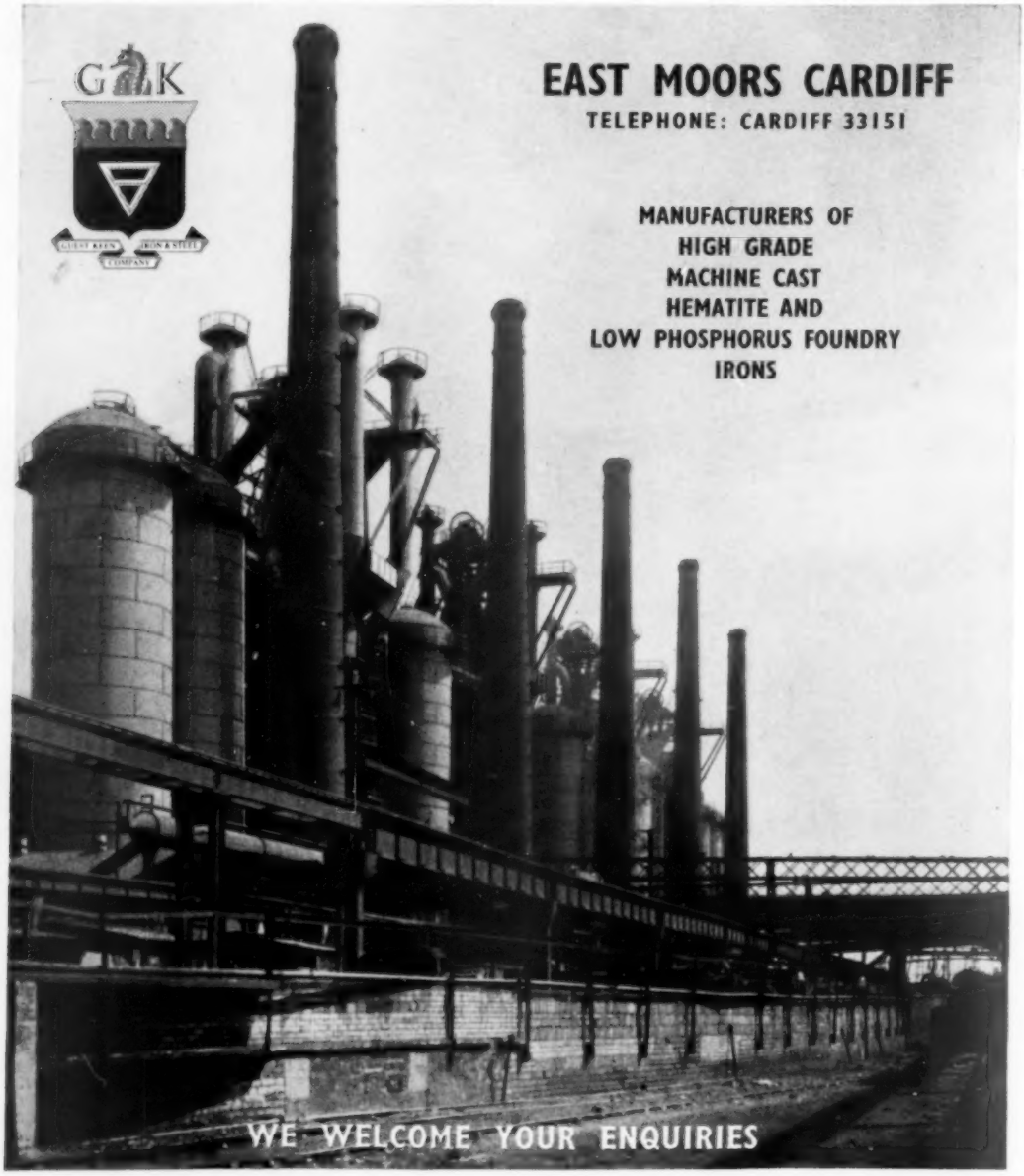

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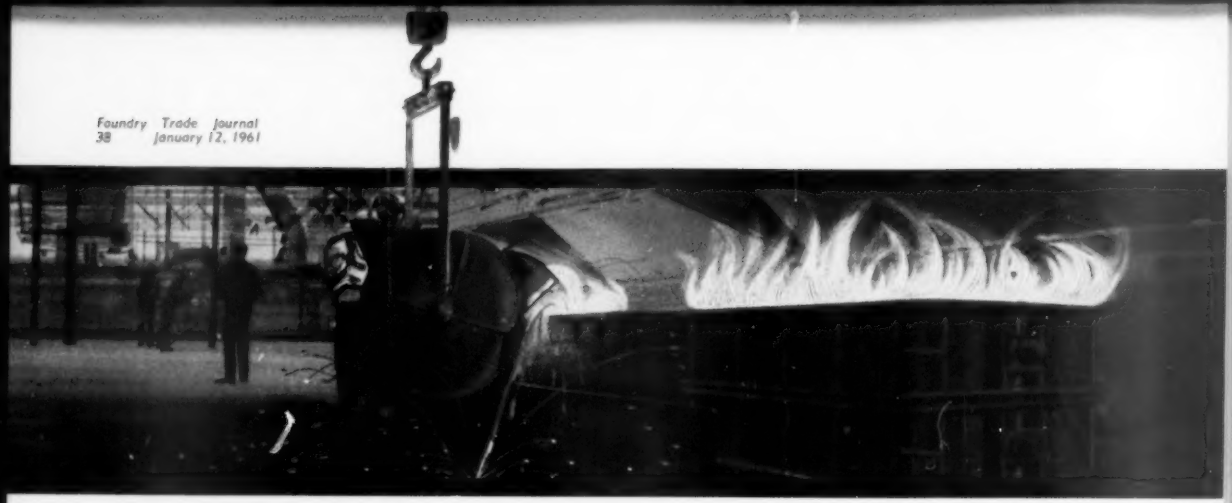

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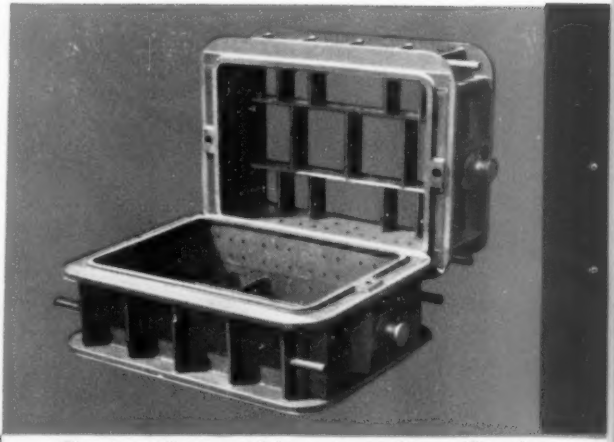

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Ein in Einzelheiten gehender Bericht über die Tätigkeiten in der Giesserei der neuen Stahlwerke in Durgapur, Indien, die von einer Gruppe der englischen Fertigungsindustrie erbaut und eingerichtet wurden. 35

Spezifische Oberfläche und Korngefüge von Giessereisand. Von F. Hofmann.
Es wird eine Methode zur Bestimmung der tatsächlichen spezifischen Oberfläche beschrieben, welche in Verbindung mit einer Siebanalyse zur Bewertung einer wichtigen Eigenschaft von Giessereisanden Verwendung findet. 45

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Highest efficiency in a FOUNDRY for BATH MAKING

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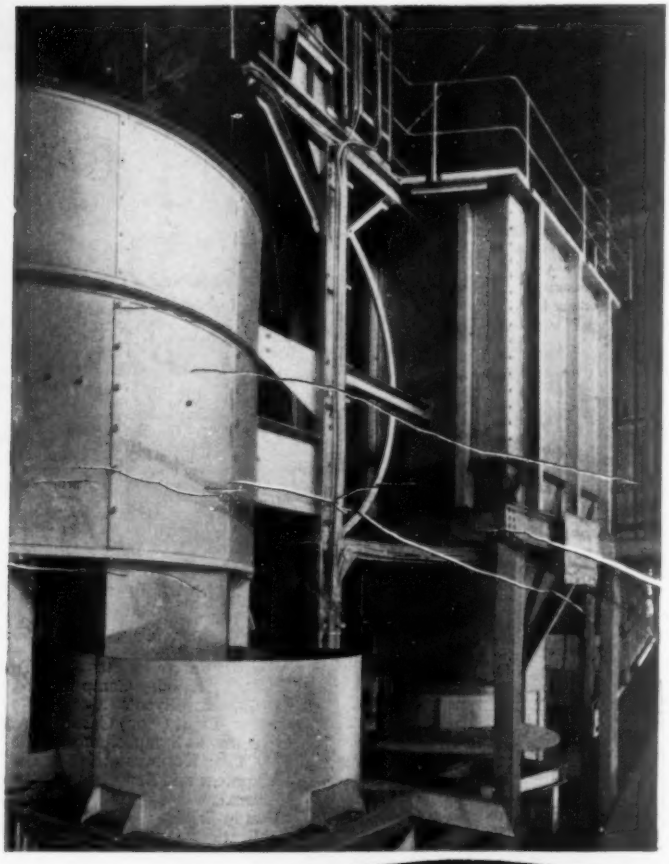

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FOUNDRY
TRADE JOURNAL

Vol. 110 January 12, 1961 No. 2301

Charter for Neophyte Technicians

Last week, there was laid before Parliament a document " Better Opportunities in Technical Education," the essential details of which have been widely publicized in the daily Press. The main objectives are: (1) To broaden the education received by technical students so that they will have a sufficient grounding in mathematics, scientific principles and English to enable them to cope with the kind of training they wish to have, and to provide continuity between education at school and technical college; (2) to adapt the system more closely to the needs of industry and, in particular, to meet the urgent need for more technicians, craftsmen and operators; (3) to improve the variety of courses to match the students' aptitudes and the careers they wish to follow, and (4) to reduce the wastage which now occurs because so many technical college students fail to complete advanced courses successfully.

So far as the foundry industry is concerned, these suggestions will be welcomed by the " enlightened industry " according to Sir David Eccles. Translating this to mean the larger firms, we entirely agree, as they do need in ever-increasing numbers qualified technicians to man the mass production plants. The small foundry concerns still require the skilled operator. Whether the acquisition of this skill is only gained through a proper apprenticeship to his trade or whether the spending of an extra year at a technical college will enable a reduction in apprenticeship period to be effected are questionable matters. The firms concerned would probably favour continuance of the day-release system. Here, however—as the Minister rightly pointed out—unless a boy possesses sufficient basic education to follow lectures he becomes frustrated and consequently money and time are irrevocably lost.

An outstanding decision in the White Paper is that during the first year following school-leaving, boys and girls will receive tuition, at a technical college, in English (in addition to the basic sciences) so that they will be able to express themselves whether speaking or writing. What the Minister hopes to achieve is to place the ordinary school-leaver in such a position that he clearly sees the road ahead exactly like those who are destined to enter the professions. For the proposed system to work, much more co-operation between industry and schools will have to be created, in order that a maximum benefit can be had through the provision of a suitable curriculum during the extra year spent at the technical college. The main change is that youth will be college based and not works based for the formative period of their career as future technicians and the like.

European Holiday Camp for Foundry Apprentices

The outstanding success of last summer's holiday camp in the south of France, organized for foundry apprentices by the training committee of the European Committee of Foundry Associations, has led the committee to arrange a second camp and this will be held at Vallon-Pont-d'Arc from July 3 to 21, 1961. The camp, which is intended for boys between the ages of 16 and 18, will be open to parties from the member-countries of ECFA, and a limited number of places will be available to apprentices from the United Kingdom.

The centre at Vallon-Pont-d'Arc is maintained by the French Government Youth Service, and provides qualified instruction in many branches of outdoor sport, and organized facilities for rock-climbing, pot-holing and canoeing. It is an ideal setting for giving the apprentices an opportunity of taking part in a wide range of outdoor activities, which is one of the principal objectives of these camps. Some idea of the varied interest the camp provides may be gained from the following summary of the 1960 holiday: "The boys spent several days with specialized instructors from the centre, undergoing basic training in rock-climbing, pot-holing and canoeing, and at the end of it, every member of the group was able to complete the following tests satisfactorily—they climbed a peak of rock more than 60 ft. high, descended into an underground cave with the aid of an 80 ft. rope ladder, and went on a day's expedition on foot to the rocky ledge of the Dent de Rez, more than 15 miles away, from which a panoramic view is obtained of the Donzère Mondragon dam and the hydro-electric station. Finally, as a fitting conclusion to the holiday, they made a canoe trip down the river Ardèche from Vallon to St. Martin, a distance of some 20 miles."

An important objective of the camp, apart from providing the boys with an experience of outdoor activities many of them have not taken part in before, is that it enables them to visit a foreign country and live in community with boys of their own age of various nationalities, who none the less have the advantage of sharing the same interests through their job, and coming from similar social backgrounds.

This Year's Arrangements

The boys will meet in Paris on July 3, and leave for Vallon in an organized party the next day. They will return to Paris on July 19, spend the following two days sight-seeing in Paris, and leave for London on the evening of July 21. Each country's delegation is accompanied, wherever possible, by a responsible adult, who has a working knowledge of French. The cost of the holiday, which includes travel from Paris to Vallon and back, and all accommodation charges, will be no more than £25. The only additional expense will be the cost of the return journey to and from Paris. At Vallon the boys will sleep on camp beds or Lilo mattresses under canvas; in Paris, accommodation is provided in a students' hostel. In view of the strenuous nature of the activities on the holiday, it is considered advisable that each boy should have a medical check-up beforehand to ensure that he is fit to take part, and it is essential that all nominees should be able to swim.

Nominations for the camp from any firm wishing to send an apprentice should reach the British organizer, the Education and Training Officer, Council of Ironfoundry Associations, 14 Pall Mall, London, S.W.1, not later than Saturday, February 18, 1961.

Forthcoming Events

JANUARY 16

Institute of British Foundrymen

Lancashire branch:—"Safety Devices in a Mechanized Foundry," by H. Pinchin, 7 p.m., at the Midland Hotel, Manchester.

East Anglian section:—"Origin, Detection and Elimination of Gases in Cast Metals," by Dr. D. V. Atterton, 7.30 p.m., at the Civic College, Grimwade Street, Ipswich.

JANUARY 17

Institute of Metals

South Wales local section:—"Metals and Alloys Used in the Jewellery and Silverware Industry," by Miss D. L. Pile, 6.30 p.m., in the Metallurgy Department, University College, Singleton Park, Swansea.

JANUARY 18

Institution of Production Engineers

Peterborough section:—"Measurement of Time," by H. M. Smith, 7.30 p.m., in the Conference Room, Peterscourt.

Society of Chemical Industry

Corrosion group:—"Metallic Diffusion Coatings," by R. L. Samuel, 6 p.m., at 14, Belgrave Square, London, S.W.1.

Institute of Vitreous Enamellers

Southern section:—"Jewellery Enamelling," by A. C. Ore, 7.15 p.m., at the Constitutional Club, London, W.C.2.

Institution of Plant Engineers

Kent branch:—"Photography in Industry," by N. E. Sherlock, 7 p.m., at the King's Head Hotel, High Street, Rochester.

JANUARY 19

Institute of Vitreous Enamellers

Midland section:—"De-enamelling Process," by R. Williams, 7.30 p.m., at the Station Hotel, Dudley. (*Not* at the Birmingham Exchange and Engineering Centre as previously announced.)

Liverpool Metallurgical Society

Papers will be presented by members of the Society and the new laboratories will be open for inspection, 7 p.m., in the Department of Metallurgy of the University of Liverpool.

North-East Metallurgical Society

"Effects of Nuclear Radiation on Metals," by H. M. Finniston, 7.30 p.m., at the Cleveland Scientific and Technical Institution, Corporation Road, Middlesbrough.

Institution Plant Engineers

Blackburn branch:—"Industrial Heating and Ventilating," by S. P. Fildes, 7.30 p.m., at the Castle Hotel, Blackburn.

Institution of Production Engineers

Southampton section:—"Production Control," by H. Horne, 7.15 p.m., at the Polygon Hotel, Southampton.

Combustion Engineering Association

Western region:—"Heat Insulation," by Martin Edge, followed by "Heat in Harness," a film by William Kenyon & Sons (Thermal Insulations), Limited, 10.30 a.m., at the Park Hotel, Cardiff.

Institute of Metals

Birmingham local section:—"Heat-treatment of Engineering Components," by E. Mitchell, 6.30 p.m., at the College of Technology, Gosta Green.

Exhibition of Foundry Art and Craft

An exhibition of various aspects of foundry art and craft with an historical background—but equally including current methods—will be held in the Great Hall of the Universtiy of Birmingham on June 20, 21 and 22. The organizers of the exhibition, which is intended for educational purposes, would be glad of any help by individuals or foundries or related bodies in the way of exhibits of products or methods of founding. Please write giving any preliminary information to: Chief Technician, Department of Industrial Metallurgy, The University, Birmingham 15.

Durgapur Iron and Steel Foundries

Layout and Equipment in India for Producing 30,000 tons of Castings Yearly.

The £100,000,000 steelworks construction scheme nearing completion at Durgapur in India includes the erection and equipping of large foundries for catering for the works' requirements of ingot moulds, and other steel and iron components, plus a small number of non-ferrous castings. The plant has been built by the Indian Steelworks Construction Company, Limited, comprising a group of British plant and engineering firms working in this field. In the account below, there is initially a brief survey of the whole project, and this is followed by a detailed description of the foundry, buildings, equipment installed in them, and the flow-process schemes to be operated for a total ferrous castings output of 30,000 tons per year.

The responsibility for the supply, construction, and erection of the Durgapur plant has been entrusted as a "package deal" to the Indian Steelworks Construction Company, Limited. Under the agreement, the performance of all plant and machinery supplied and installed is guaranteed by ISCON. Technical supervision and consultant services are rendered by the International Construction Company, Limited,* London.

The cost of the plant is at present estimated at Rs. 138 crores (£103,500,000), with an ancillary expenditure of about Rs. 28 crores (£21,000,000), thus bringing the total to about Rs. 166 crores (£124,500,000). The contract with ISCON was signed in October, 1956, and the scene at Durgapur was quickly transformed from a rural to an industrial setting, as many as 30,000 workers being employed at the site.

* The Indian Steelworks Construction Company, Limited, is a consortium of 13 well-known British companies with an independent chairman. The constituent member-companies are: Davy & United Engineering Company, Limited; Head Wrightson & Company, Limited; Simon-Carves, Limited; Wellman Smith Owen Engineering Corporation, Limited; Cementation Company, Limited; British Thomson-Houston Company, Limited; English Electric Company, Limited; General Electric Company; Metropolitan-Vickers Electrical Company, Limited; Sir William Arrol & Company, Limited; Cleveland Bridge & Engineering Company, Limited; Dorman Long (Bridge & Engineering), Limited, and Joseph Parks & Son, Limited.

Stop Press : As this article goes to Press further progress at Durgapur Steelworks is reported. Construction of this new Indian steelworks is well up to schedule and the Indian Steelworks Construction Company, Limited, is determined to beat the scheduled completion date in April 1961 of stage III of the scheme. At the end of stage III more than three-quarters of the work will be finished and at the present rate of progress it seems this target will be reached ahead of time. Since No. 1 blast-furnace went into production at the end of last year, activity has intensified. Halfway through 1960 steelmaking and shaping was under way with the commissioning of three open-hearth furnaces, three rolling mills and the sleeper plant. Operation and construction are now in progress side by side. Construction is now well advanced on the third and final units of the coke-oven and blast-furnace plant. The structural work for the remaining four open-hearth furnaces in the steel melting shop is complete and two are now lined with refractory bricks. The final two units of the rolling-mill plant have progressed so far that some of the electric drives of the section mill have been tried out and mechanical equipment tested. Stage IV—the final stage—at Durgapur includes the wheel-and-axle plant, details of which were not finalized until after the start of the original contract. Construction has now been phased so that wheel sets for Indian railways will be produced early in the Autumn of 1961. This plant, when complete, will have an annual production capacity of 45,000 wheel sets.

Planning and Construction

For the planning, construction, and co-ordination of all the work within the perimeter of the rolling mills, central engineering-shops, iron and steel foundry, and wheel-and-axle plant at Durgapur, Davy and United Engineering Company, Limited, has been responsible. This responsibility covers civil-engineering and building work, structural work and plant and equipment. The services of W. S. Atkins & Partners were retained by Davy-United in the capacity of consultants for all the civil-engineering and building work.

Excavation Work

Site levelling and terracing, totalling some 3,000,000 cu. yd. was carried out by Caterpillar DW.21 scrapers, and these proved particularly suitable for the project, in view of the relatively long hauls, averaging about half a mile, although pusher tractors were necessary over much of the site if full loads were to be achieved in the heavier clays. For all small and deep excavations, nothing was found to equal the performance of the human chain of labour, as an average worker could transport up to 2 cu. yd. per shift over a haul of several hundred feet, or up inclines impassable to vehicles. In general, foundations proved no particular problem, except during the monsoon season. The clays and clayey sands, of which the site is predominantly composed, stood up vertically with little or no timbering, and ground water for most of the year was slight. The majority of the foundations were simple bearing footings, resting on firm clay or compact sand, but in some cases—due to heavy concentration of loads, the possible shrinkage of the clay under the effects of heat, or for other design considerations—piling was employed.

Building Construction

The total floor area of all buildings on the Durgapur project is approximately 3,500,000 sq. ft., including such main production shops as the steelmaking plant, etc. Apart from these structures, there are 700,000 sq. ft. of buildings, including the

Durgapur

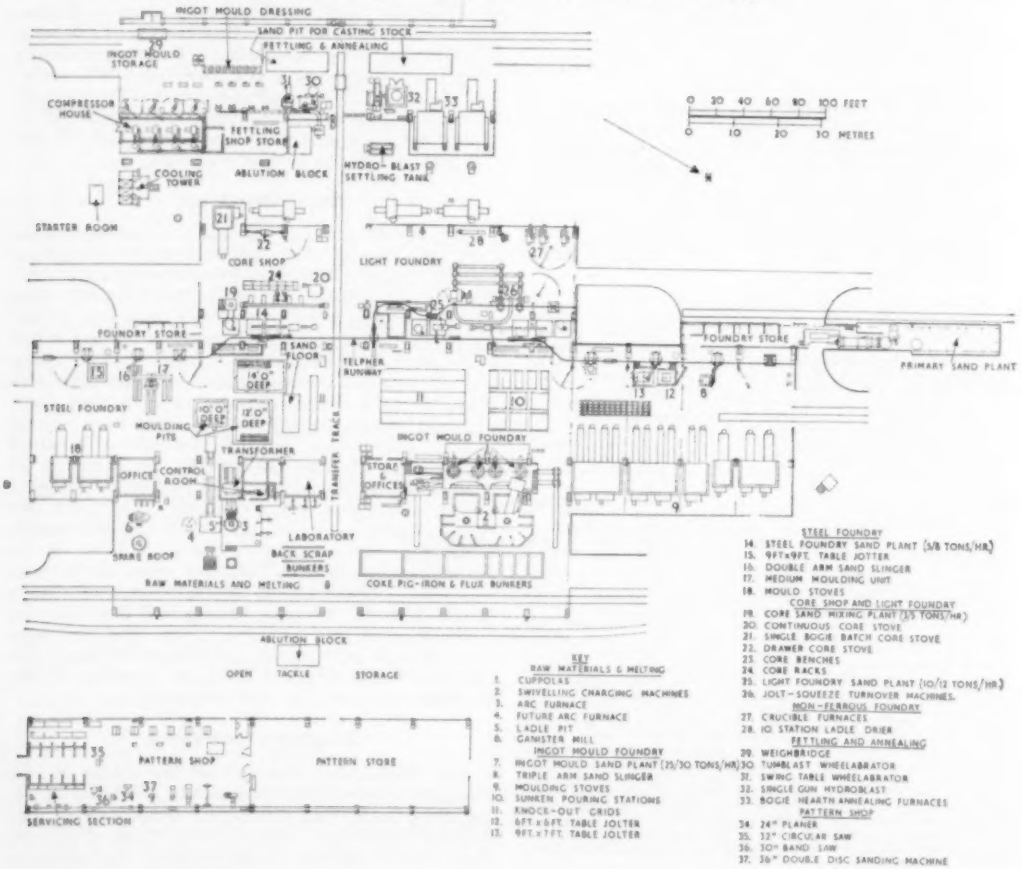
seven-storey administrative block, departmental offices, stores, substations, and pump-houses. These were all grouped together and handled by an area manager.

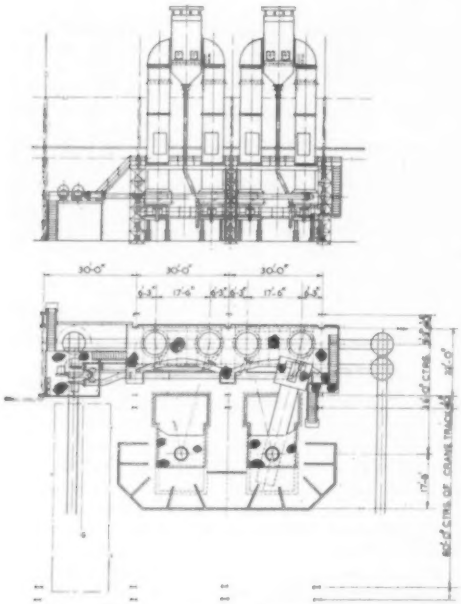
With the exception of the main administrative block (which is reinforced-concrete framed) all buildings are of brick, rendered inside and out, with flat reinforced-concrete roofs, covered by an insulating layer of lime mortar laid to falls. Bricks were made locally by small family businesses, grouped along the banks of the Damodar river. Railway construction totalled approximately 70 miles and peak monthly production attained 4.2 miles. The 20 miles of roads reached a peak production of 3.2 miles per month. ISCON delegated to the Cementation Company the task of providing the temporary services required on the site during construction, by the consortium as a whole, and this represented an additional major civil-engineering commitment. Temporary roads and railways totalling 37 miles were required during the course of the contract; the operation, control and maintenance of these and a number of smaller, but no less important, services remaining the responsibility of Cementation-Patel throughout the contract.

The foundry is sited close to the central engineering-shops and here, too, it was decided to found directly on clays. Originally, the foundations were designed for a pressure of 1½ tons per sq. ft., but investigation showed that in this area, the clays were of poorer quality than originally expected and it was decided to redesign the foundations to limit ground pressure to 1¼ tons per sq. ft. Ground level in the area was low and had to be built up to a height of up to 8 ft. to finished floor level.

The foundry consists of three separate steel-framed buildings—the fettling and annealing bay measuring 270 by 100 ft.; the pattern-shop and -stores 320 by 60 ft., and the main foundry area

FIG. 1.—*Layout of the iron and steel foundries at Durgapur.*





550 by 280 ft. In the foundry area, there are several pits varying both in size and complexity, and these were constructed in reinforced-concrete, the largest being 70 by 65 by 10 ft. Pits in the sand-plant area were particularly complex and, in parts, up to 27-ft. deep. All pits had to be designed to withstand water pressure in addition to the lateral pressure from the floor loading. Moulding pits must be dry and were designed to be completely watertight, and concrete in this area was designed to cope with the sharp rises in temperature which occur when foundry casting.

FOUNDRIES

The engineering of the iron and steel foundries and the supply of machinery and allied equipment have been the responsibility of Davy and United Engineering Company, Limited, as main contractors. Because, however, of the specialized nature of plant of this type, Campbell Gifford & Morton, Limited, a firm highly qualified in foundry design and layout, has acted as consultant for all stages of the project. The general layout of the plant is shown in Fig. 1.

The largest regular production tonnage of the foundry is to be cast-iron ingot moulds, of which approximately 20,000 tons per year will be produced. These will be suitable for casting ingots up to 7 tons in weight for rolling purposes and up to 4 tons for wheel forging. In addition, the foundry is capable of producing each year a further 5,000 tons of a variety of iron castings, 5,000 tons of steel castings, and a small quantity of non-ferrous castings, most of which will be used for general maintenance purposes throughout the steelworks.

The large airy buildings, coupled with the planned location of the equipment, provide ample working space with the maximum of operational flexibility.

To eliminate operator fatigue, mechanized methods of moulding have been provided where practicable, and the dirty working conditions normally associated with foundrywork are minimized by the installation of dust- and fume-removal plant.

The foundry will make a distinct contribution to the economic and operating efficiency of the steelworks, for not only is it equipped with the most modern production aids, but it will also draw the bulk of its raw materials from within the works itself. These materials include foundry pig-iron from the pig-casting plant, coke, and selected mill scrap.

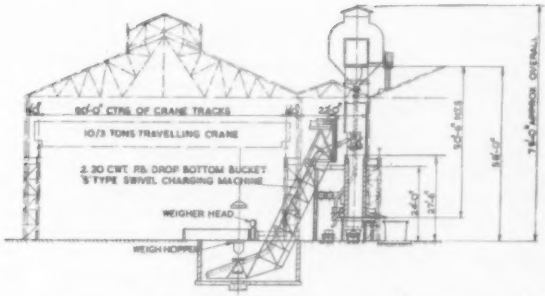

80'-0" CTRS. OF CRANE TRACKS
10/3 TONS TRAVELLING CRANE
2.20 CWT. F/B. DROP BOTTOM BUCKET
'S' TYPE SWIVEL CHARGING MACHINE
WEIGHER HEAD
WEIGH HOPPER

FIG. 2.—*Layout of the cupolas in the iron foundry at Durgapur. The estimated iron-production rate of one pair of these furnaces is 20 tons tapped per hr.*

Foundry Buildings

The design, fabrication, and erection of the buildings for this section of the plant was entrusted to the Cleveland Bridge & Engineering Company, Limited. The steelwork was fabricated in the United Kingdom and shipped to India " knocked down " for site assembly. The foundry buildings comprise three main bays connected to form two covered annexes, with in addition two separate buildings housing the fettling and annealing shop and the patternshop and pattern store. Various lean-to structures are provided to accommodate mould stoves, annealing furnaces, stores, and compressors. Leading dimensions of the main bays are given in Table 1.

TABLE 1.—*Dimensions of Main Bays.*

Bay.	Length.	Crane span.	Height to crane rail.
	ft.	ft.	ft.
Patternshop and store ..	320	60	25
No. 1, Raw materials and melting	330	80	30
No. 2, Melting bay annexe ..	330	25 (width)	
No. 3, Moulding and casting ..	550	80	30
No. 4, Coreshop, light foundry, and non-ferrous melting	270	60	30
No. 5, Fettling and annealing	270	65	30

* Account furnished by and printed by courtesy of Davy & United Engineering Company, Limited (originally appearing in a special issue of *Iron and Coal Trades Review*).

Durgapur

The buildings are of conventional riveted construction with pitched roofs to all bays incorporating continuous louvreless ridge ventilators. Galvanized corrugated steel has been used for roof and side sheeting, and to ensure adequate ventilation the side cladding generally extends from roof tie level to a point 10 ft. above ground level.

Crane girders are of welded-plate construction. The crane rails are held in position by forged-steel clamps, facilitating rail maintenance.

All gable ends are designed to permit ready extension of each bay if required with the minimum interruption of normal foundry operations.

The cranes serving the foundry area are all industrial type category "D", and have been supplied by Sir William Arrol & Company, Limited. Those serving the coreshop and patternshop are floor controlled. Magnet equipment is fitted to the raw materials and melting bay cranes and creep speed devices to those installed in the moulding and casting bay and the coreshop. A summary of the cranes is given in Table 2.

TABLE 2.—*Foundry Area Crane Data.*

Crane No.	Bay.	Hoist capacity.	Span	Remarks.
		Tons	ft.	
1	Raw materials and melting	20/5	80	Magnet equipment
2	Raw materials and melting	10/3	80	Magnet equipment
3A, 3B	Moulding and casting	35/10	80	
4A, 4B	Moulding and casting	10	80	
5	Coreshop	5	60	Floor control
6A, 6B	Fettling and annealing	20/5	65	
7	Patternshop ..	2	60	Floor control

Patternshop

The patternshop is equipped with a complete range of modern machines for the manufacture of patterns—including a small quantity of non-ferrous metal patterns. The machines include band and circular saws, lathes and sanders, a milling machine, and a planer, while a small separate section is equipped to service the woodcutting tools. Lifting facilities are provided by a 2-ton capacity floor-controlled overhead crane. Half the building floor area is used for pattern storage.

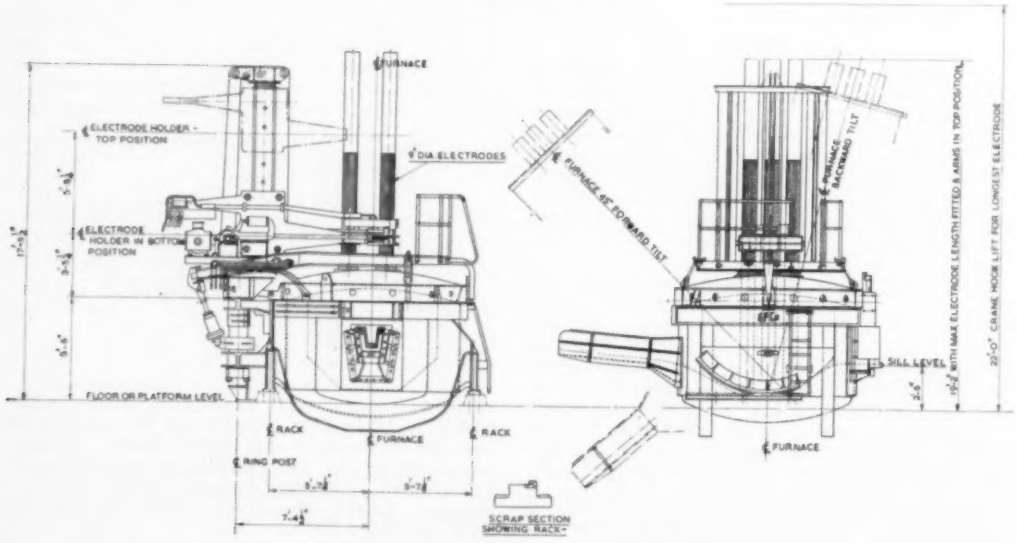
Raw Materials and Melting Bay

No. 1 bay is laid out entirely for handling incoming raw material and its utilization in the melting of iron and steel.

Iron melting is carried out in four cupola furnaces (Fig. 2), each of 10 tons per hr. nominal capacity, arranged for mechanized bucket charging in pairs, with one furnace in each pair in operation each day. The estimated iron-production rate for one pair of furnaces is 20 tons tapped per hour, which will enable iron castings of up to 18-tons weight to be produced.

Pig-iron is received in rail wagons from the pig-casting plant adjacent to the blast furnaces, unloaded by a 10/3-ton overhead crane, and charged into the cupolas in the form of cold pig by 1-ton capacity "S" type charging machines fitted with weigh-hoppers. Coke and flux materials are

FIG. 3.—*Top-charge electric-arc furnace of 6 tons nominal capacity installed in the steel foundry at Durgapur.*



handled from the incoming rail wagons into stock bunkers and loaded into the hoppers as required.

Hot metal from the cupolas is tipped into iron ladles situated in the moulding and casting bay. Fifteen such ladles are included, with capacities ranging from 10 cwt. to 20 tons.

Steel is melted in No. 1 bay in a top-charge electric arc furnace of 6 tons nominal capacity (Fig. 3). This hydraulic-tilting furnace has a 9 ft. 6 in. dia. body with slagging door and spout, and is equipped with roof raising and slewing gear, electrode raising and lowering gear, and roof coolers. Electric power is supplied through a 2,500-kva water-cooled transformer complete with reactor and electrically-operated off-load tap change mechanism. The primary windings of the transformer are suitable for an 11,000-volt supply and six tappings are provided to give a range of furnace voltages. The three electrodes are controlled by a rotodyne regulator.

Scrap steel received by rail wagon is unloaded into bunkers by magnet equipment attached to the auxiliary hoist of a 20/5-ton overhead electric crane which serves this area of the plant. When required, the scrap is loaded from the bunkers into one of two furnace-charging baskets of the drop-bottom type, each of 140 cu. ft. capacity. The bottoms of the baskets are hemispherical in shape, designed with opening leaves which are supported during loading by special mild-steel stands. To charge the furnace, the roof is first slewed to one side, when the charge basket is lifted by the overhead crane and its load deposited into the furnace base.

When melting is completed, the furnace is tapped into steel ladles which are lifted by the overhead crane and placed on an electrically-operated transfer car for transport to the adjacent steel foundry in No. 3 bay. Altogether 11 ladles are supplied, with capacities ranging from 10 cwt. to 10 tons.

Initially, the use of one arc furnace will enable a range of castings to be provided up to a maximum "as-cast" weight of 7½ tons. Provision is made in the layout for the addition of a second electric-arc furnace, which would allow the eventual production of castings up to 15 tons in weight. The raw materials and melting bay is served by two overhead cranes of 20/5 tons and 10/3 tons capacity.

Melting Annexe

The melting annexe houses the main columns of the cupolas together with a general store and two buildings for office accommodation. A laboratory in this annexe is fully equipped to deal with the day-to-day routine control of hot-metal analysis and moulding-sand quality. Also located in this area is the arc-furnace control room.

Moulding and Casting Bay

Molten metal from the cupolas is received directly into the north end of No. 3 bay from the cupola spouts, and the primary function of this area is the production of ingot moulds. For this purpose one 6 ft. by 6 ft. and one 9 ft. by 7 ft. table jolters are provided, together with a moulding pit served by a triple-arm Sandslinger. Also located in this half of No. 3 bay are eight bogie-type mould-drying stoves.

The assembled ingot-mould tackle is placed in an area housing 11 sunken pouring stations with adjustable floor-level walkways between each section, for the casting of ingot moulds. Moulds poured during any one day are placed on one section of a 60 ft. by 40 ft. static knockout grid. Five separate grid sections, each 60 ft. by 8 ft., are available, so that each day's production of moulds may remain undisturbed on the grid to cool for about a week. Each section is provided with its own used-sand belt conveyor, which delivers on to a common return system. A dust-collecting machine serves individual grid sections as required.

Sand moulds or large castings which cannot be transported are dried by portable electric mould driers. A large range of moulding boxes is provided for small and medium-size castings.

The south end of the bay is equipped for the production of both steel and large pit-moulded iron castings. The plant includes a 9 ft. by 9 ft., 10-ton table jolter, a 4,000-lb. roll-over moulding machine with a double-arm Sandslinger, and three bogie-type mould-drying stoves. Steel castings are transferred for sand removal to a 40 ft. by 5 ft. static knock-out grid. This area of the plant is served by two 35/10-ton and two 10-ton overhead cranes.

Primary Sand Plant

As prepared foundry sand it not available at Durgapur, a primary sand plant has been installed to deal with unprepared local sand deposits. Provision has been made within the primary sand plant building for the future installation of soft-rock and hard-rock crushing machines for the treatment of unprepared materials.

Sand arriving at the foundry by road or rail is unloaded into the primary sand plant, where it is dried and screened before being pneumatically conveyed into any of the three main sand-distribution systems. In the primary sand plant building the sand is first shovelled on to a 6 ft. by 6 ft. static grid, whence it drops into an underfloor receiving chute. The chute passes the sand by way of a bucket elevator into a small hopper which delivers it through a gas-fired sand drier. After drying, the sand is conveyed by a second bucket-type elevator to a rotary screen housed directly above a small despatch hopper. Depending upon the type of sand which is being processed, the operation of a rotary valve at the base of this hopper at the same time as the operation of a cyclone at the appropriate storage point for any one of the three sand plants, enables the clean, dry sand to be conveyed by overhead pipe line to storage hoppers in the sand plant annexe.

A separate door has been added to the sand-receiving hopper below the screen to enable core sands to be treated separately and then removed by skip to the coreshop area.

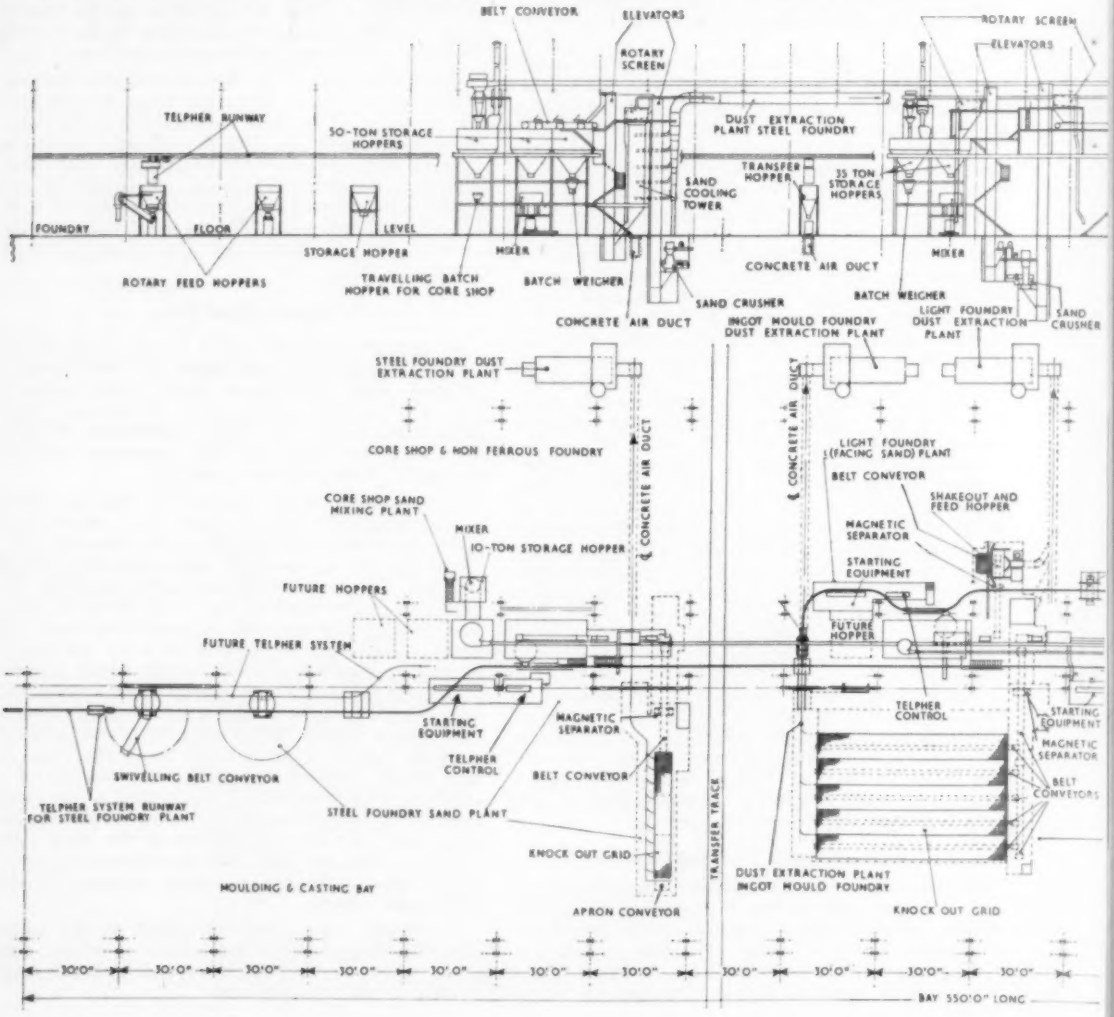
Durgapur

Sand Plant Annexe

Located between Nos. 3 and 4 bays is a moulding sand preparation plant, designed and constructed by August's, Limited, of Halifax. This plant (Fig. 4) incorporates the most modern equipment for sand distribution and control, and adds considerably to the efficient and economic operation of the foundry as a whole. The use of an automatic telpher for mixed sand distribution, as opposed to a conveyor system, involves a minimum of maintenance work and also enables the plant to be kept clean and free from spillage.

Separate systems are provided for steel-casting sand, iron-casting sand, and facing and non-ferrous sand.

Sand which is required at a specific moulding point is first delivered from the appropriate main storage hoppers into a travelling batch-weighing machine. Sand quality can be varied, depending upon whether new or used sand is taken from these storage hoppers. The weighed sand is discharged into a mixer where it receives various additives to suit the requirements of the particular moulding process. On completion of the mixing operation, the sand is discharged into a small skip which is transferred to the overhead telpher locomotive. This remotely-controlled unit delivers the skip to the required moulding point and, after discharge, returns automatically to its home station. All storage hoppers at the moulding points have level



detectors, enabling a signal for further supplies to be sent to the main sand plant operator as required. A feature of the plant is the rail track system, which is so arranged that any type of sand can be despatched to any part of the foundry moulding area.

The used sand, knocked out from castings in the ironfoundry, passes through the static knock-out grid on to belt conveyors. The sand travels through an overband magnetic separator where loose ferrous particles are removed, then through a crusher, and finally up a bucket elevator into the used-sand hoppers. The steel sand knock-out system is identical with that for the ironfoundry, with the exception that an extra bucket elevator is fitted together with a cooling tower in order that the sand may be relieved of a certain amount of heat before it passes into the storage hopper.

Coreshop and Light Foundry

The north end of No. 4 bay is laid out as a light foundry and is also equipped for the production of non-ferrous metals. The light foundry employs a large percentage of mechanized plant, including two 1,300-lb. jolt/squeeze turnover machines complete with a roller conveyor system and vibrating knock-out grid. Non-ferrous melting is carried out by two batch melting furnaces each of 10-cwt. capacity, fired with coke-oven gas, and one similar furnace of 600-lb. capacity. Adjacent to the furnaces are a centrifugal casting machine for casting machine-bushes up to 1-ft. internal diameter by 3-ft. long, and a 10-station ladle and crucible-drying unit for

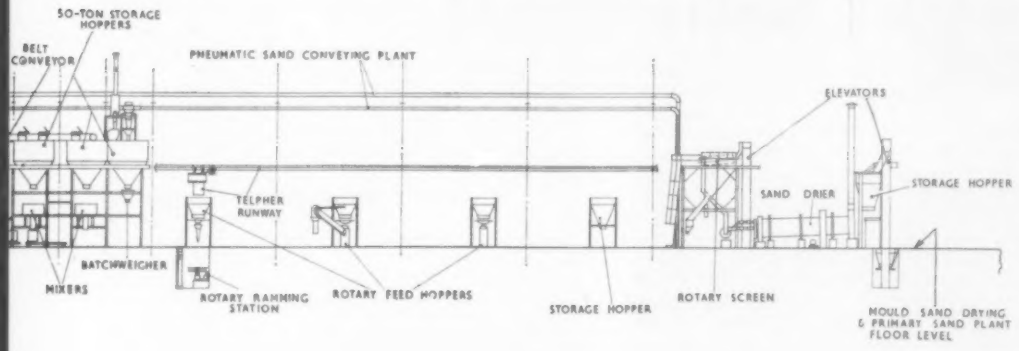
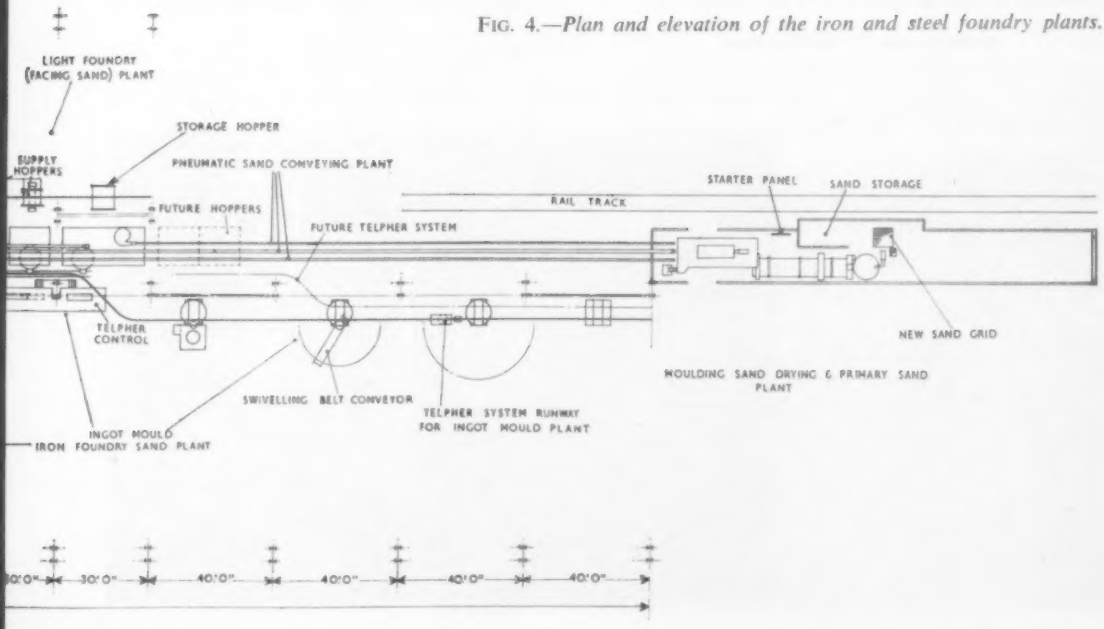


FIG. 4.—*Plan and elevation of the iron and steel foundry plants.*



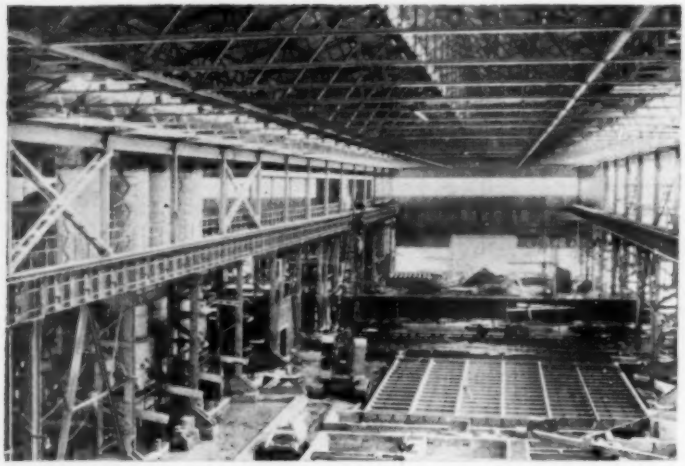


FIG. 5.—*Part of the foundry photographed during the later stages of erection. The four cupola furnaces can be seen on the left.*

ladles up to 3-cwt. capacity. Core-preparation equipment, which includes five moulding benches, occupies the south section of No. 4 bay.

Core sand is taken either from the steelfoundry sand plant or directly from the primary sand plant and is mixed in the coreshop in a mixing plant having an hourly capacity of 3 to 5 tons. A continuous vertical core-drying stove is provided, together with a single-bogie batch corestove and a drawer corestove. Partly-prepared cores for drying are taken from the core benches to the vertical core drying stove loading point by a steel belt conveyor. No. 4 bay is served by a 5-ton floor-controlled overhead crane.

Fettling and Annealing Bay

All castings, excepting non-ferrous castings, are fettled in No. 5 bay, most of the machines being provided with modern dust-removal equipment to enable the operators to work in comfortable conditions.

The heavier castings, after knocking out, are transferred to the fettling bay on a central transfer bogie of 25-tons capacity which is pushed or pulled by a diesel tractor. A trailer is provided to handle skips containing the lighter castings.

A hydraulic blasting unit removes sand cores both from ingot moulds and intricate general castings. Medium weight iron and steel castings are cleaned in a table-type Wheelabrator, while small castings are dealt with by a Tumblast machine. General fettling is carried out on fettling benches and double pedestal and swing-frame grinders. Castings which are too large to be handled by the main static machines are fettled by hand-held pneumatic and electrically-operated tools.

Steel castings are heat-treated in this bay in two bogie-hearth type gas-fired annealing furnaces, each of effective chamber dimensions, 18 ft. long by 13 ft. 6 in. wide by 8 ft. 6 in. high from bogie to flat arch roof. The two 20-ton overhead cranes provided for this bay both have 5-ton auxiliary hoists. Facilities are provided for weighing all castings before despatch.

Services

Coke-oven gas is piped to the various bays for ladle drying, mould drying, core and sand drying, and annealing, the estimated possible intermittent demand being 120,000 cu. ft. per hr. An 18-in. dia. main supplies the foundry from the main gas-distribution system of the steelworks.

Certain items of plant such as the air compressors and the electric furnace and its transformer require a continuous supply of clean water for

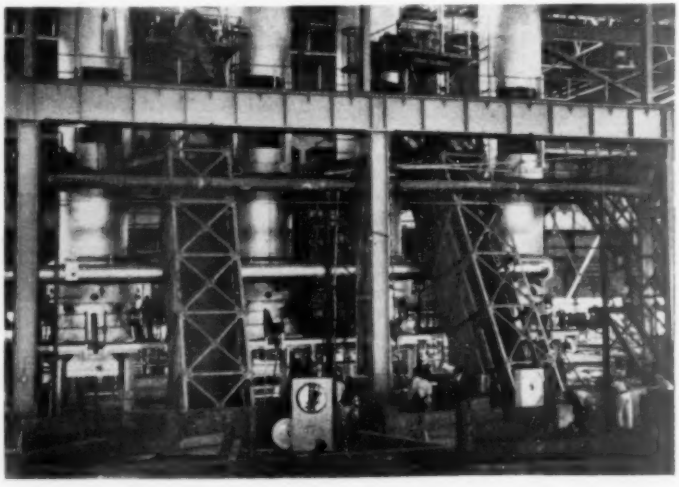


FIG. 6.—*View of the cupolas and charging equipment in the iron foundry, Durgapur.*

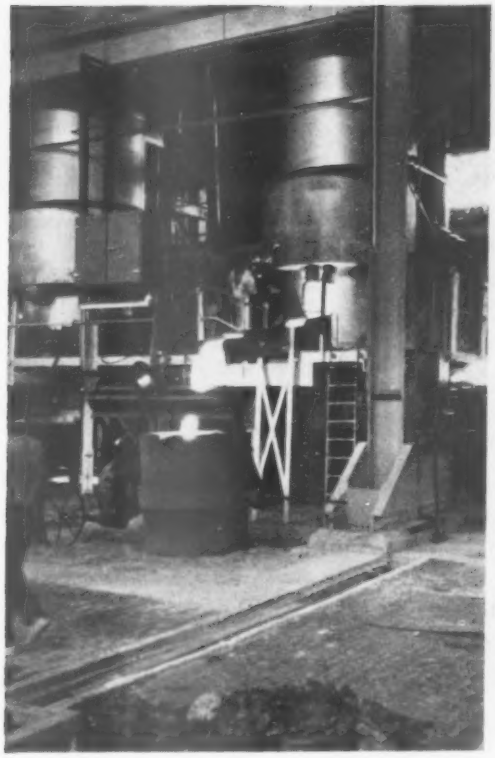


FIG. 7.—*Iron being tapped from one of the cupolas which are located in a side bay.*

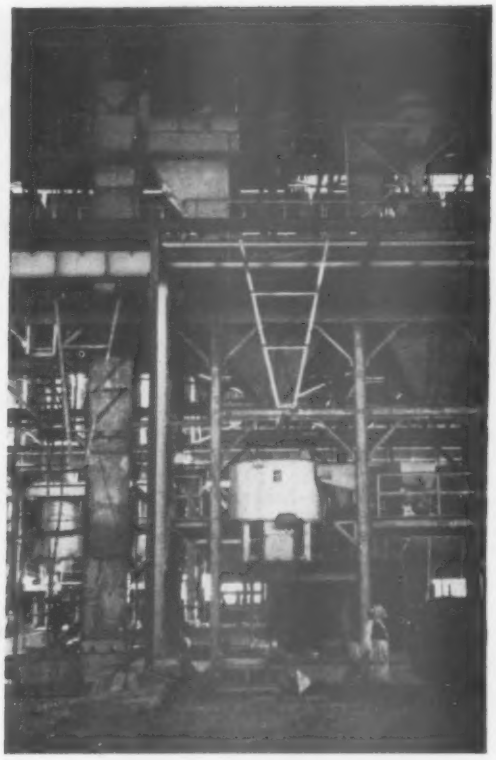
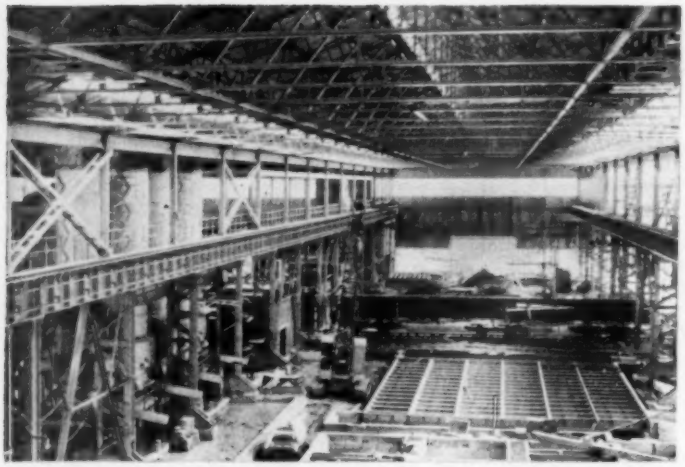


FIG. 9.—*Arrangement of the sand plant in the light iron foundry section of the works.*

cooling purposes totalling about 20,000 gall. per hr. To save water, a recirculating system is used, incorporating a forced-draught water cooler complete with duplicate pumps to provide the necessary pressure. The hourly make-up requirement of settled water is approximately 3,840 gall. and this is taken from a 4-in. dia. pipe off the steelworks main settled-water distribution system.

Settled water for process and general purposes in the foundry which require an intermittent supply is piped *via* a 6-in. dia. main from a 250,000 gall. storage tank which also supplies the C.E.M. department and from which the foundry demand

FIG. 8.—*Pouring in progress in the iron foundry; moulds are floor banked for this purpose.*



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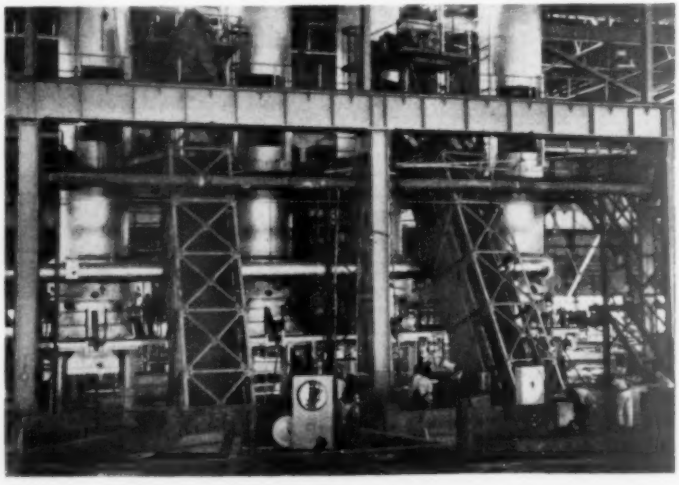

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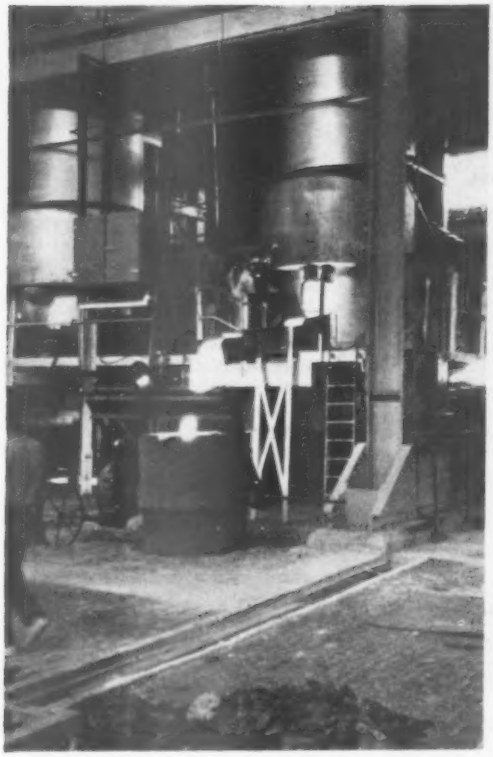
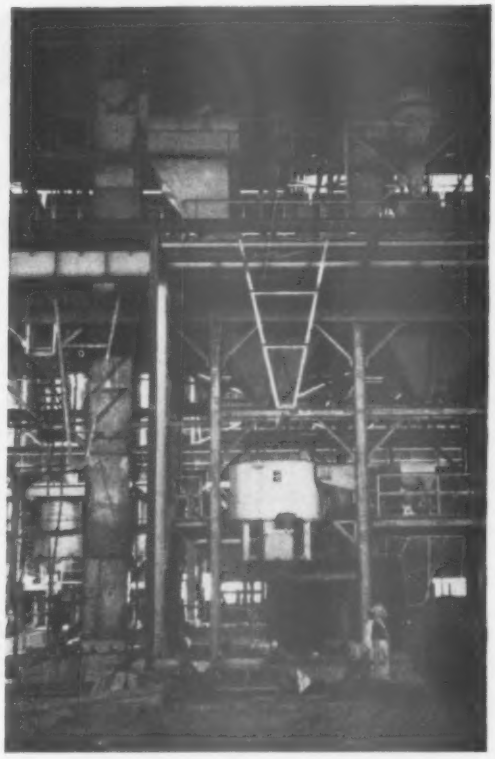


FIG. 7.—*Iron being tapped from one of the cupolas which are located in a side bay.*



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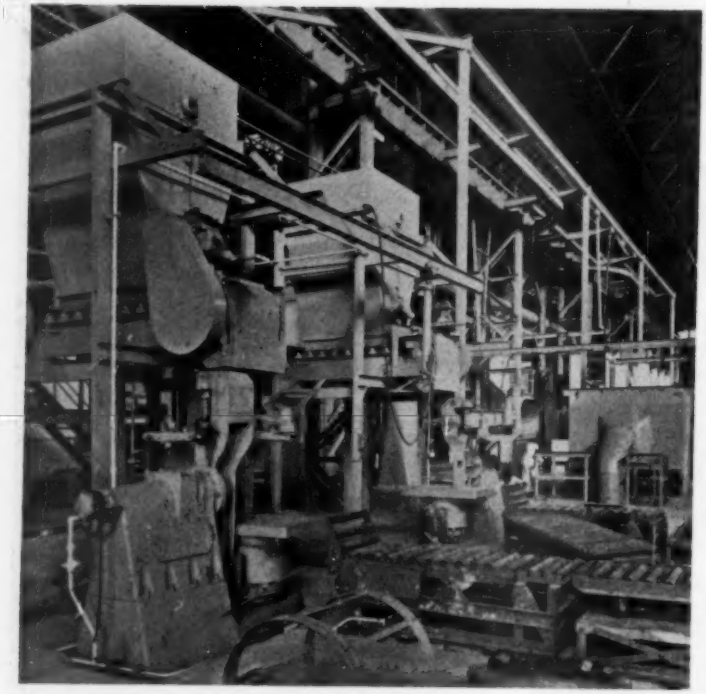

FIG. 10.—*Moulding equipment in the light foundry at the Durgapur plant, showing the telpher rail-track above and sand feed-hoppers at left and centre.*

is generally 3,200 gall. per hr. In the case of a pump failure or burst main occurring in the recirculation system, there is a connection from the storage tank into the system which can be brought into use as an emergency measure. Domestic water for personnel requirements is supplied from a 2-in. dia. main off the main domestic water-distribution system.

Oxygen is piped to various consumption points in each bay, the supply off the main distribution system being at 250 lb. per sq. in. in a 2-in. dia. main.

A lean-to on the east side of the fettling bay houses four two-stage rotary compressors each capable of delivering 520 cu. ft. per min. of free air at 100 lb. per sq. in. to supply compressed air for the whole of the foundry.

Fire protection is provided by a 10-in. ring-main externally around the foundry, with hydrants at suitable points. together with portable fire-fighting equipment. In the case of the patternshop and stores, which can be considered as having an extra fire risk, an automatic sprinkler system is fitted.

Waste water, effluents, and sewage are collected by a system of drains and piping, and discharged into the main drainage and sewage system for the steelworks.

Road and rail access is provided into the main foundry block and road access into the patternshop and store.

The lighting in the main bays is by blended mercury discharge and tungsten filament lamps, giving, under reasonable conditions, an average intensity of of illumination near the floor of 6 lumens per sq. ft.

The foundry sub-station forms part of the main electrical distribution system, which operates at 30,000 and 11,000 volts. It is equipped to provide power at 460 volts direct current, mainly for production cranes, and at 3,300 volts alternating current for large motors and at 400 volts for motors of less than 100 h.p.

Provision for Future

In view of the fact that the Durgapur works will, in the future, be increased in capacity, consideration had to be given to the possible introduction, in the extensions, of methods of operation other than those envisaged for the initial output. To make such allowances for known alternative methods and for other methods not yet fully developed, areas of ground were reserved at suitable positions and the detail layouts of the departments were considered with this end in view. This has resulted in a plant layout of larger area than would be necessary for present requirements, but the consulting engineers have had experience in the past of the difficulties arising by reason of the works area having been settled without due consideration of, and provision for, future extensions and possible new methods of production.

CLAY CROSS URBAN COUNCIL, Derbyshire, have decided not to support a local Clean Air Exhibition unless it concentrates solely on fuels that are directly or indirectly, products of coal.

THE GAS COUNCIL, 1, Grosvenor Place, London, S.W.1, has issued a supplement to their sixth edition of the "Coke Burning Appliances" handbook, which illustrates and describes over a dozen new models.

A FRAMED PHOTOGRAPH of William Edgar Allen, founder of the Sheffield steel firm of Edgar Allen & Company, Limited, now hangs in the new Tapton secondary school, Sheffield, to remind pupils who belong to Allen House in the school of the origin of their house name. The four houses in the school are named after steel manufacturers who lived in the Fulwood area of Sheffield where the school is situated. Other houses bear the names of Firth, Osborn and Mappin.

Specific-surface and Grain-structure of Foundry Sands*

By F. Hofmann

The rôle of sand both as a refractory, and as the plastic medium in which moulds for castings are formed, makes its technology extremely important to foundrymen. Experience and experiment have isolated a number of factors upon which the mould characteristics of foundry sands depend. Undoubtedly many of the aggregate properties of compacted sand masses are governed by the intimate nature of the discrete particles. In the following the Author discusses the latter aspect, and by a simple experimental procedure demonstrates a correlation between two characterstics of separate grains, which is likely to be of practical importance to founders.

The Author has already pointed out in previous publications[1] the important relationship existing between grain-size, grain-distribution, and grain-shape—in addition to their mineralogical nature—and the behaviour of moulding sands in the foundry. Further factorial-values and their determination are described in the following—values which are of considerable practical importance and which yield information not obtainable by the conventional methods of sand testing. In particular, the importance and the method of finding the specific-surface of foundry sands, will be discussed, as well as the resulting method for the determination of the grain-shape. Specific-surface and grain-shape have been found to determine to a high degree the properties of clay-bonded foundry sands. A further newly-developed method to be described, enables an experimental, and quantitative, determination of the inner grain-structure of sands to be found, which can be expressed as a function of their mineralogical nature. This affects, in the first instance, the consumption of core-binders used with foundry sands. A combination of the various new methods described enables very accurate and comprehensive qualitative knowledge of the characteristics of sands.

(A) Actual Specific-surface

The actual specific-surface of sands and other granular materials is the total outer-surface in sq. cm. per gm. of the material. The method to be described takes into consideration the grain-shape of the sand, that is to say, the actual shape of the sand grains. The more angular the grains are, the larger is their specific-surface for the same grain distribution. The measuring of the actual specific-surface is based on the passing of air through a long cylindrical-column of sand. The actual specific-surface S_a is a function of the porosity, and of the permeability, of the sand column. This relationship may be expressed as follows:—

$$S_a = \frac{\text{constant}}{\text{bulk density}} \sqrt{\frac{\text{porosity}^3}{\text{permeability}}}$$

F. M. Lea and R. W. Nurse[2] developed a method for the determination of the surface of powders (cement), based on a semi-empirical formula for the actual specific surface S_a established by P. C. Carman[3]. R. L. Blaine[4] simplified the testing equipment considerably; now being used generally is his adaptation for measuring the specific surface of powders, particularly in the cement industry.

The Author of this paper adapted the principal features of Blaine's equipment for the testing of powders, to determine the specific-surface of sands as shown in Fig. 1. The sand to be tested has

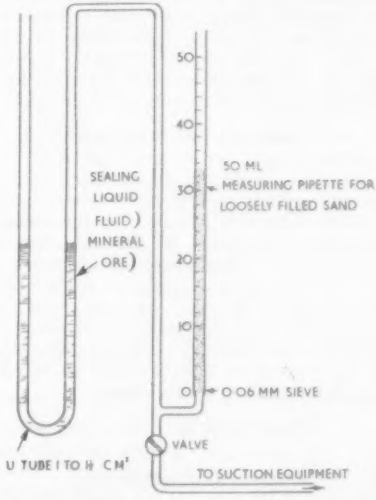

FIG. 1.—*Schematic view of the apparatus for the determination of the actual specific-surface of sands.*

first to be freed from bonded clay by boiling with sodium-pyrophosphate solution, followed by intense stirring. Then the sand is placed on a 0.06-mm. sieve (about 190 mesh), washed with a water-jet, and finally dried. The same sample is later-on used for the determination of the theoretical specific-surface by sieve-analysis. The dried sand is now filled into the 50 ml. measuring

* Abstracted from a paper published in *Giesserei* **47** (1960), pp. 49–56.

Specific-Surface and Grain-structure

pipette (Fig. 1), which is gently tapped until the volume remains constant. Different sands have different loose-pile-volumes. The finer the sand, the larger the pile-volume, and the lower the bulk-density. At the same time, the dispersion of grain sizes has its effect, because sands with a narrow band of grain dispersion have larger volumes than sands with widely dispersed grain sizes. Theoretically one would expect the "packed-sand-density" to be independent of the grain size, but practically this is not so, because natural sands never possess a perfectly smooth or a ball-shaped surface; consequently the increasing specific-surface, in connection with a declining-grain size, has an obstructing effect on the bulk-density of the sand. The ensuing procedure is based on the time taken for a current of air to pas through the sand-column.

(B) Theoretical Specific-surface

The theoretical specific-surface of sands can be calculated from the sieve analysis. It is based on the assumption that all grains have a perfect ball shape, and the generally quite different shape of the grains, is disregarded for this purpose. The theoretical specific-surface is calculated in a way similar to the method of establishing the AFS-grain fineness number (which is a value kindred to the specific-surface), by using multiplying factors for every sieve fraction of these sands, adding the products of multiplication, and dividing the sum by the total weight of the sieved material.

(C) "Coefficient of Angularity"

The more the grains of a sand are of an angular shape, the greater must be the discrepancy between the actual specific-surface and the theoretical specific-surface (which is based on the assumption of ball-shaped grains). By dividing the actual specific-surface S_a—determined as described under (A)—by the theoretical specific surface S_{th}—as calculated under (B)—the resulting value, called the "coefficient of angularity," provides a new characteristic for foundry sands which was first applied by Robertson and Emödi[5]. This relationship may be expressed as follows:—

$$CA = \frac{S_a}{S_{th}}$$

(D) Internal Grain-structure

The experimental method described here is based on the determination of the water-absorption capacity of a sand, and the apparatus used is a vacuum-filtration apparatus, illustrated in Fig. 2. 200-gm. of clay-free washed sand are filled into the funnel of the vacuum-filtration apparatus, and rinsed with water containing an added wetting agent, first hot, then cold. Then the filter pump is connected and the water in the sand above the filter paper sucked away. When all water is removed, a fair average sample of 100-gm. is taken from the sand in the funnel, and the still-retained water determined by drying in an infra-red dryer until constant weight is obtained. The difference by weight (the "retained-water-content") is an indication of the water-absorption-capacity of the sand, which basically depends on the content of dense one-crystal silica grains; but the retained-water-content is also influenced by the other grains present, which may be more or less porous. If tap-water is used, more water is "retained" (as meniscusses between the individual grains), than when the water used contains a wetting-agent; this has the effect of retaining only a thin film of water on the outer grain surface, and the capillary-effect is reduced to a minimum. The graph in Fig. 3 shows the water-absorption-capacity (retained-water-content when using water with added wetting-agent) plotted against the actual specific-surface of mineralogically differently composed sands. The dotted-line indicates the water absorption of pure-monocrystalline dense one-crystal silica-sands, and is the basis-line for the separate determination of the inner and outer water-absorption, of sands with mineralogically complex-grain structures e.g. composite-silica grains, felspar grains, cleavable-rock splinters, etc.

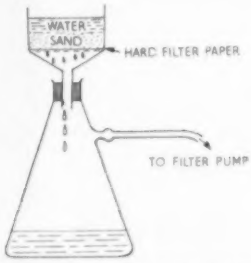

FIG. 2.—*Schematic view of the vacuum-filtration apparatus for the determination of the water absorption capacity of sands.*

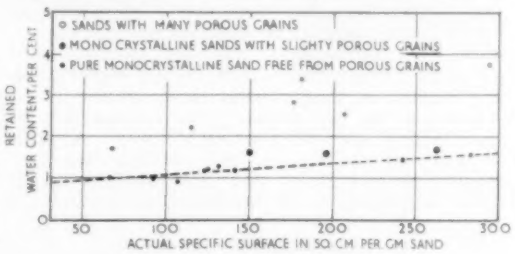

FIG. 3.—*Graph demonstrating the relationship between the water-absorption-capacity (retained-water-content), and the actual specific-surface of various sands, on which the former is dependent.*

The effect of a larger, or smaller, number of porous grains in a sand is a determining factor, when using liquid binders in relatively small quantities. The porous grains take their fill first—that

is to say, they have to be saturated by an excess of binder, before a bonding-film can develop on the outer surface of the grains. In the case of clay-bonded sands, additional water is taken up by the sand grains only; whereas the clay particles themselves, are too large to be penetrated, and can still develop their full bonding capacity after the porous grains have been saturated with surplus water. Frequently the adhesion of the clay film is even better on the rough surface of porous grains, than on smooth dense grains, and the achievable strength is therefore greater. The first experiments only were made with ordinary tap water, then the decision was taken to change over to water containing 4-ml. of liquid, non-ionized wetting-agent per 1,000-ml. of water. Commercially-clay-free foundry sands were used for another set of experiments with linseed oil bonding. It was found that the strength of linseed-oil bonded sands fell with increasing water absorption capacity of a sand—this is, in the first instance, the effect of an increased number of porous grains. The linseed oil addition was kept constant at 2 per cent. for this set of experiments. The sands were dried for 2 hours at 230 deg. C. The next set of experiments was made with increasing linseed oil additions, and the sands were again dried for 2 hours at 230 deg. C. The quantities of linseed oil required to obtain a sand strength of 20 kg. per sq. cm. (*i.e.* 285 lb. per sq. in.) were plotted in Fig. 4 and are shown in amazing agreement with the figures obtained with the same sands, when their retained-water-content, using water with added wetting agent, was determined.

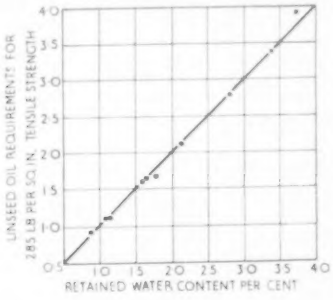

FIG. 4.—*Linseed-oil requirements (in per cent.) of the experimental sands for obtaining a tensile strength of 20 kg. per sq. cm. (285 lb. per sq. in.), correlated with the retained-water-content (water absorption when using a wetting-agent) of the same sands.*

Summary

(1) The determination of the actual specific-surface of sands, makes it possible to estimate the outer grain surface which has to be saturated with bonding films, taking the grain shape into consideration. (2) The actual specific-surface provides a continuous measure for a significant effect caused by grain shape, and grain distribution. (3) The specific-surface is an important factor for the compacting-capacity of sands. The resistance against a compacting force depends, in the first instance, on the specific-surface, provided that equal binder quantities are compared. (4) In conjunction with the theoretical specific-surface, which can be calculated from the sieve analysis, the actual specific-surface of sands can be used for calculating the coefficient of angularity, this being an expression for the grain shape. (5) The method for the determination of the actual specific-surface makes it possible to establish separately the grain fineness, the grain distribution, and the grain shape, of a sand. (6) The very important effects of the inner porosity of the grains of various sands—effects which cannot be established by ordinary sieve analysis, and by measuring the specific-surface—can be determined, quantitatively, by the new method of measuring the water-absorption-capacity. The experimental results reported, correct the erroneous opinion that the consumption of corebinders depends only on the fineness of a sand, or on its specific-surface. (7) The method for measuring the water-absorption-capacity of sands, in combination with the determination of the actual specific-surface, makes it possible to establish separately, the adhesive property of liquids on the outer-grain surface and on the mineralogically-conditioned inner structure of sands. (8) The determination of the water-absorption-capacity of clay-free sands, permits a direct quality-evaluation in respect of their behaviour towards liquid binders. For a chosen sand, the consumption of core binders can be quickly, and correctly, estimated. (9) The retained-water-value is a direct measure for the core binder requirements of sands returned from a sand-reclamation plant, as compared with the binder consumption of new sands.

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Machine-tool Orders top £100,000,000

For the first time in four years the machine-tool industry's order-book tops the £100,000,000 mark. Expansion began in the second quarter of 1959 and in the last 18 months has risen from £50,000,000 to £102,000,000. New orders have continued to flow in at a high rate, and in October, the last month for which figures are available, orders from UK cutomers totalled £9,400,000, compared with £8,000,000 in September, and £8,400,000 in August.

According to figures for the engineering and electrical goods industries, published by the Board of Trade, production in October was 2 per cent. more than in October, 1959. All the increase was in the industries producing capital goods, where output is still expanding, though at a slower rate than in the early months of 1960. New orders continue to be received at about the same rate as in the second and third quarters of the year.

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Scottish Light (Iron) Castings Review

By Our Scottish Correspondent

It would be wrong to say that the light-iron castings industry in Scotland has overcome all its problems and difficulties during the past year but, at least, trade has been considerably brighter than it has been for some time and the outlook for the future does not cast so many dark shadows as were evident following cessation of the post-war boom. It has been, not only a year of continuing reorganization to meet changing demands for light-iron castings products, but a period of intense mechanization to increase efficiency and production.

The fortunes of those supplying castings to the building industry have often followed the rise and fall in house construction and, in this respect, the year has been one of more optimism especially with increased private building taking place throughout the country. Baths, grates, pipes and domestic appliances are in demand as new housing schemes take shape or older houses are modernized.

Another very heartening feature during the year has been the decrease in the numbers of unemployed foundry personnel. The employment position generally was regarded as very satisfactory at the end of the year; most encouraging has been the decrease in short-time working. There were several men on this unsatisfactory employment basis at the beginning of the year but towards November and December short-time was almost completely eliminated, a state of affairs which, despite the constriction in the labour force, which has been taking place in recent years, gives cause for added confidence amongst those employed in producing light-iron castings.

Reorganization Plans

Allied Ironfounders, Limited, proceeded with their modernization plans for the foundries of their northern group. Although the bulk of the Allied Group's sales are in England, especially in the Midlands and in the south, it was felt that every effort should be made to revitalize their Scottish foundries at Falkirk instead of letting them run down and shifting production to England. The redevelopment programme now being carried out will mean that the fear of redundancy in the light-iron castings industry should be removed, and, given favourable trade conditions, there may well be extra jobs available as the full effects of the modernization programme are realized.

After the closing of a number of foundries, the re-opening of the Castlelaurie foundry after extensive re-equipment, was another cheering item during the year. The Dobbie Forbes works at Larbert has been practically rebuilt and when completed should be one of the most up-to-date foundries in the country. The reorganization plans include the closing of the Callendar Abbots and the Forth & Clyde foundries but their manpower, output, and new plant for the manufacture of cooking- and heating-appliances, will be absorbed in the Dobbie Forbes works, and in the Castlelaurie foundry, specializing in the production of rain- and soil-pipe goods.

At the Falkirk works of M. Cockburn & Company, Limited, £250,000 worth of new mechanized plant is being installed, primarily for the production of baths. The Carron Company have also recognised that changing times call for changes in methods, materials and products, and this is made evident in the large-scale reconstruction programme of buildings and works layout presently under way. During the year, Carron has produced quality heavy-duty catering equipment for the galleys and pantries of the new P & O liner Canberra. For this ship, too, Carron engineers have designed and manufactured a revolutionary type of side-loading cargo-handling device which replaces winches on board liners. In another part of the works a seven-figure contract is under way for the supply of castings to Glasgow's Whiteinch-Linthouse Clyde tunnel. These are jobs outside the normal production of baths, heating- and cooking-appliances.

The Falkirk Iron Company have also had encouraging success with catering equipment, and a new food-distribution system for hospitals has been markedly successful in this country with a resultant number of inquiries from hospital authorities on the Continent. A number of important contracts for the installatiton of catering equipment in hotels have also been carried out.

There is still a satisfactory flow of apprentices into the light-castings industry and the value of the training provided at Burnbank Foundry Trades Centre, which was established as the result of an approach from the industry for day-release courses for apprentices in the foundry trades, has proved highly successful. The conduct and operation of the courses are discussed between employers, trade unionists, and educational representatives serving on a joint advisory committee.

Light-metals Symposium in India

Inauguration of a symposium on the "Light-metal Industry in India," organized by the National Metallurgical Laboratory, Jamshedpur, India, will be carried out by Professor M. S. Thacker, director-general, scientific and industrial research, New Delhi, on February 14 at 10.30 a.m. Sir J. J. Ghandy, director-in-charge, Tata Iron and Steel Company, Limited, and chairman of the Executive Council of the Laboratory, will preside.

The purpose of the symposium is to discuss latest technological and research developments in the field of light metals and their alloys, with particular reference to the growth of the industry in India during the third "Five Year Plan," especially indigenous production. Sections of the symposium will cover local raw materials for the light-metal industry; pyro-, electrical- and hydro-metallurgical techniques of production; physico-chemical reactions governing extraction metallurgy of light metals; technical advances in metal casting; reclamation and refining of light-alloy scrap; heat-treatment of light metals and alloys; corrosion resistance properties, and the rôle of light metals in metallurgical, chemical engineering and nuclear-reactor technology. The symposium is to be held over the four days, February 14 to 17, in the auditorium of the National Metallurgical Laboratory.

Fifty Years of Progress Lecture

Mr. A. S. Beech, M.I.MECH.E., managing director of Foundry Equipment, Limited, is to lecture students of the North Lindsey Technical College, near Scunthorpe, Lincs (principal Mr. F. C. Jones) on February 1, at 7.0 p.m. He has chosen for his subject "Fifty Years of Progress in Jobbing and Repetition Foundries in Great Britain from 1910 to 1960" and the lecture will be illustrated with lantern slides. Much hitherto unpublished information has been assembled and the talk will also touch on new and important developments, it is stated. Visitors will be welcome at the meeting.

New Year Honours

A number of the principal awards in the New Year Honours list to people associated with the foundry, iron and steel and kindred trades were featured in last week's JOURNAL. Further details with a few biographical notes on the recipients are given below:—

SIR ELLIS HUNTER, chairman since 1948 and managing director of Dorman Long & Company, Limited, Middlesbrough, and president of the British Iron and Steel Federation for eight years from 1945, has been made KBE. He was knighted in 1948.

Sir Ellis qualified as a chartered accountant in 1913 and during the first world war worked with the Ministry of Munitions on iron and steel works extensions. He joined the board of Dorman Long in 1938 as deputy chairman under Lord Greenwood, becoming managing director the following year. During his association with the company he has been responsible for its exceptional developments, especially since the last war. He was the first chairman of the British Steel Producers' Conference (1945-46).

As president of the British Iron and Steel Federation from 1945 to 1953, he took a leading part in the formulation of the Iron and Steel Industry's Plan of Development, published as a White Paper in 1946.

KNIGHTS BACHELOR

DR. CECIL DANNATT, a director of Associated Electrical Industries, Limited, who was appointed vice-chairman last year with special responsibility for co-ordinating commercial and technical policy. He was also managing director of A.E.I. (Manchester), Limited, formerly the Metropolitan-Vickers Electrical Company, Limited, before the reorganization of the AEI group, but relinquished this office on becoming vice-chairman of AEI. Chairman of Sunvic Controls, Limited, Dr. Dannatt is also a member of the boards of a number of companies including Metropolitan-Vickers-Beyer Peacock, Limited, and Micanite & Insulators Company, Limited. He joined the board of Metropolitan-Vickers as director and chief electrical engineer in 1947 and became deputy managing director in 1954, being appointed managing director six months later. MR. K. R. PELLY, chairman, Lloyd's Register of Shipping, and of Wm. France, Fenwick & Company, Limited, shipowners, Newcastle-on-Tyne. Mr. Pelly was president of the Chamber of Shipping from 1956-57.

ORDER OF THE BRITISH EMPIRE

Civil Division

CBE

MR. WILLIAM EBENEZER CLARK SOUSTER, chairman and managing director of E. E. Baguley, Limited, locomotive and wagon builders, of Burton-on-Trent, for political and public services. He is a member of the general council of the Engineering and Allied Employers' National Federation and chairman of the Burton District Mutual Engineering Society. MR. CHARLES THACKER, managing director of the Ford Motor Company, Limited. MR. ARTHUR JAMES YOUNG, managing director of the English Electric Valve Company, Limited, Chelmsford (Essex), a subsidiary of the English Electric Company, Limited.

OBE

MR. JAMES BLACK, manager of the Moss End (Lanarkshire) works of Imperial Chemical Industries, Limited, for the past 12 years. He has served with ICI for almost 40 years. MR. FREDERICK WILLIAM JOHN GALE, managing director of S. G. Brown, Limited, makers of precision instruments, etc., of Watford. MR. WILFRED ROY HARVEY, manager of the marine department, of Babcock & Wilcox, Limited, boiler manufacturers, etc., of Glasgow. MR. MARTIN WILLIAM JONES, principal examiner, Ministry of Power. MR. ALFRED JOHN TAYLOR, experimental works manager, Dowty Rotol, Limited, Cheltenham (Glos).

MR. ROBERT VERT, secretary of the North East Coast Engineering Employers' Association, at Gateshead. MR. THOMAS MUIR WILSON, vice-chairman of the Scottish Board for industry, and a member of the board since 1951. MR. FRANK WOODHEAD, chairman and managing director of Toledo Woodhead Springs, Limited, laminated and coil spring manufacturers, Aycliffe Trading Estate, near Darlington. Mr. Wood head, who is 61, is also chairman of T.A.I.P. (Engineers), Limited, of Welwyn Garden City (Herts), John Spencers (Light Springs), Limited, Newburn-on-Tyne, and Toledo Woodhead (Sheffield), Limited.

MBE

MR. WILFRID GEORGE ADAMS, senior executive officer, Ministry of Power; MR. FRANK BAKER, assistant works manager of A. Reyrolle & Company, Limited, electrical engineers and switchgear manufacturers, of Hebburn (Co. Durham); MISS JOSEPHINE BRENNER, secretary to the director, British Cast Iron Research Association, for 35 years. She joined the Association two years after its formation in 1921, serving under Dr. J. G. Pearce until his retirement in 1921. MR. JOSEPH BERNARD HADFIELD, chief of the Admiralty machinery design department, Wallsend Slipway & Engineering Company, Limited; MR. HAROLD EDWIN HALL, designer, armament drawing office, Vickers-Armstrongs (Engineers), Limited, Barrow-in-Furness; MR. JACK HIGHAM, general secretary of the National Union of Stove, Grate and General Metal Workers; MR. JAMES HUTTON, manager, personnel services, Scottish Group, Stewarts and Lloyds, Limited, steel and tube products manufacturers, of Glasgow, who has been with the group for 47 years. MR. JOHN THOMAS JACKSON, group works engineer since 1957 for Joseph Lucas, Limited, manufacturers of car electrical equipment, of Birmingham. He has worked for the company for 37 years, and was deputy group works engineer for 25 years; MR. EDWARD COLEBY KIDSON, lately chief estimator, Silley Cox & Company, Limited, engineers, founders, and ship-repairers, of Falmouth; MR. CHARLES HAROLD MEIGH, managing director of Meigh Castings, Limited, engineers' founders and glass-mould manufacturers, etc., of Cheltenham (Glos); MISS DOROTHY HICKS MERCER, executive officer, National Physical Laboratory, Department of Scientific and Industrial Research. MR. HENRY LAWRENCE PILKINGTON, manager, quality staff, David Brown Industries, Limited, Huddersfield; MR. WILLIAM LESLIE ROE who is chief metallurgist at Aiton & Company, Limited, pipe engineers, of Derby. He joined the company in 1939 and spent the war years working in HM Dockyards for the Admiralty. It is for services rendered to the Admiralty that he is made MBE. Mr. Roe, who was educated at Derby and District College of Technology, served his engineering apprenticeship with Roe & Harrison, Limited, a Derby firm no longer in existence, of which his father was managing director. He is a former chairman of the East Midlands branch of the Institute of Welding at Nottingham, a member of the Institute of Physics, and a member of a number of committees of the British Welding Research Association and the

New Year Honours

British Standards Institution. MR. REGINALD PERCY ROGERS, director and general manager of Unit Tool & Engineering Company, Limited, precision engineers, of Blackpool.

BRITISH EMPIRE MEDAL

MR. JOHN BOYD, driller, Mechans, Limited, Glasgow; MR. JOHN CARTER, assitant foreman, Associated Electrical Industries (Manchester), Limited, Eccles; MR. EDWARD STANLEY CHIDSEY, foreman carpenter, Vickers-Armstrongs (Aircraft), Limited, Addlestone (Surrey); MR. CHARLES WILLIAM CLARKE, foundry apprentice instructor, Marshalls Sons & Company, Limited, Gainsborough; MR. ROBERT WILLIAM CRAWFORD, assistant chief inspector, Armaments Division, Armstrong Whitworth Aircraft, Limited, Coventry; MR. ARTHUR JAMES DISLEY, foreman moulder, Coburg Dockyard Foundry, Mersey Docks and Harbour Board, Liverpool; MR. RALPH GOODWIN, foreman, Newton Bros., Limited, Derby; MR. JOHN ROBERT GRIFFITHS, No. 1 Inspector, Aluminium Corporation, Limited, Dolgarrog (Llanrwst); MR. CHARLES LOSH, head foreman, J. S. White & Company, Limited, Cowes, Isle of Wight; MR. ALBERT EDGAR MAY, development inspector, Bristol Siddeley Engines, Limited, Coventry; MR. THOMAS CHARLES HENRY MILES, fitter, Elliott Bros. (London), Limited, London, S.E.22; MR. ARCHIBALD PETTICREW, head foreman fitter, Harland & Wolff, Limited, Belfast; MR. JOHN RICHARDSON, shipwright, Barclay Curle & Company, Limited, Glasgow; MR. JOHN TAYLOR SMITH, foreman, Ductile Steels, Limited, Willenhall (Darlaston, Staffordshire).

News from South Africa

Swaziland Iron-ore for Japan

Nine Japanese businessmen have negotiated a £4,200,000-a-year agreement in Johannesburg, with the Anglo American Corporation under which Swaziland will ship to Japan 1,200,000 tons of iron-ore every year for ten years, beginning in 1964. Talks are at present being held between the Corporation and the British Government about building a rail link between Swaziland and Lorenco Marques to meet the needs of this new industry, and it is expected that it will be in operation in time for the first shipment to Japan in January, 1964.

Negotiations which began between Mr. Y. Inayama, executive vice-president of the Jawata Iron and Steel Company of Japan, and Mr. Henry Oppenheimer with Mr. Marshall Clark of Anglo American, in London, resulted in a provisional agreement for the Japanese steel mills—Yawata and the Fuji Iron and Steel Company with other concerns possibly joining in the arrangement later—to take 1,200,000 tons of iron-ore from Swaziland every year for ten years.

Two Japanese trading companies will have, between them, a 20 per cent. interest in the Swaziland undertaking and will handle the shipping and financial side for the Yawata and Fuji companies. The agreed price of 70s. per dry-long-ton, free-on-board at Lourenco Marques, was arrived at on the basis of an iron content of 65 per cent. As result of this agreement Swaziland will supply about 5 per cent. of the estimated 20,000,000 tons of iron-ore a year which Japan intends to import, starting in 1964.

Iron-ore Mine Mechanized

Large-scale mechanization of the Iron and Steel Corporation's (Iscor) iron-ore mine at Thabazimbi—at a cost of about £1,000,000—has brought about an increase in the production rate. Whereas previously the steelworks at Pretoria consumed 30,000 tons of iron-ore weekly, as a result of mechanization and modernization, Thabazimbi is now expected to provide 35,000 tons per week.

Five mining units, each consisting of a gathering-arm loader and two diesel-electric shuttlecars, are now used in the eastern section of the mine, while two units are held in reserve. Each of these units requires only three semi-skilled operators per shift, and can produce 1,000 tons of ore per-day. Conventional mining methods on the other hand would require 20 scrapers, each with its own operator, to achieve the same rate of production. An additional advantage of these new mechanized methods is that they permit mining operations to be carried out in a more restricted area. In order to mine 1,000 tons of ore by conventional methods an area 600 to 700 ft. in width is required, but by using mechanized methods this same tonnage can be won from an area only 100 ft. in width.

Included in the plans for extensions at Thabazimbi is the construction of two vertical shafts and this work is nearing completion. These shafts will be used to transport men and machines, to and from the various levels in the mine.

Expansion Plans

Dr. F. Meyer, chairman of Iscor, has announced that the Corporation is about to start a new expansion programme, extending over a period of 12 years and costing between £270 and £280 million. Minor additions to and replacements of existing plant, which continually take place, are included in this amount. This estimate pre-supposes that the annual rate of increase in the prices of equipment, over the 12-year period, will not be higher than it has been during the last few years.

The current expansion programme, involving a cost of approximately £56 million, will be completed within the next 12 months, and will raise the Corporation's rate of production to about 2,350,000 ingot-tons of steel per annum. But apart from this current expansion and modernization programme, a thorough study during the last year has revealed that by 1964/65 Iscor should in any case then be producing at least 500,000 tons per annum more than the above-mentioned 2,350,000 ingot tons.

The Union of South Africa's requirements of those steel products now manufactured by Iscor, will call for between 4,350,000 and 4,500,000 ingot tons in 1972, which means that Iscor must increase its annual steel production by between 2,000,000 and 2,150,000 ingot tons. There also arises the possibility of greater exports of Iscor products and, according to Dr. Meyer, this will receive further attention.

South African Car Conference

A major step towards the manufacture of an all-South-African car may result from a conference in Port Elizabeth in March, called by General Motors South Africa (Pty), Limited. Between 400 to 500 manufacturers and potential manufacturers of car components have been invited to attend, and matters of mutual interest to assembly plants and car-component manufacturers will be discussed. The South African Government has for some time been planning the manufacture of a South African car and Board of Trade officials have drawn up a scheme which will have far-reaching effects on the Union's motor industry. The project centres on rapidly expanding the range of original and replacement parts made in the Union's car-component factories.

General Motors say the greater use of South African manufactured components in locally-assembled vehicles has always been a matter of major policy and one that will assume greater significance to the whole economy in the future. It is essential that the highest degree of co-operation exists between the manufacturers of components and assemblers of motor vehicles.

Equipment and Supplies

Vibrator Motor

Recently, the JOURNAL'S representative visited a large mechanized iron foundry in the Leeds area to examine the application of vibratory electric motors for operating a shakeout unit. The installation at the foundry (Fig. 1) comprised the addition of two out-of-balance motors (model VI 200/4), produced by the English Electric Company, Limited, of Bradford, to a shakeout unit of grid size 6 by 5 ft., furnished by Acme Conveyors, Limited, 58-62, Seaward Street, Glasgow, S.1. The shakeout grid inspected was conventional in shape, mounted on pairs of coil springs at the corners of each of the short sides of the frame and the motors were bolted on at the centre of the same sides. The incorporation of the vibrator motor had eliminated an eccentric-shaft drive to the unit and after several months' trial, the users reported complete satisfaction with the operating characteristics of the new assembly. Certainly, to the writer it appeared to deal quickly and efficiently with moulds placed upon it in rapid succession and to do so with less noise than one usually associates with shakeouts of that size.

The vibration itself (which gives a controlled up-and-down movement to the shakeout) is generated by out-of-balance weights attached at either end of the motors and which can be adjusted by single bolts to give the required output. To the query that such an out-of-balance movement would surely give rise to heavy wear on the bearings, the reply was given that such is the large size (Fig. 2) of these bearings (70-mm. bore, 180-mm. o.d. and 42-mm. wide for a 1½-h.p. four-pole motor) that many thousand hours' life can be expected. Other advantages claimed for this foundry application of the vibrator motors include elimination of motor foundations and vee-belts as compared with shaft-type vibrators, simplicity of amplitude adjustment and accessibility for maintenance if necessary. Essential fixing details embrace the use of high-tensile mounting bolts with locknuts and the check tightening of these after an initial run. Heavy tough-rubber cable is necessary for electrical connections, of course. When considering application of such a unit to existing plant, it is necessary to furnish information as to the total weight of the shakeout and of the load it has to carry.

(The same vibrator motors can also be used, it is understood, for sand conveying—units up to 60 tons per hour have been installed—assisting the flow of material from hoppers, and for vibratory barrelling machines.)

Positive Blowers

Recent modifications have been made to the range of type RBS Holmes-Connersville positive air-blowers, manufactured by W. C. Holmes & Company, Limited, Turnbridge, Huddersfield. The impellers and shafts are now of fabricated construction in steel, the maximum pressure for some sizes being increased from 10 to 15 lb. per sq. in. Another modification is that the blowers are constructed with air gaps which completely isolate the bearing housings and gears from the casing, thus ensuring that under no circumstances (even in the event of an oil-seal failure) is it possible for air passing through the blower to become contaminated with oil or oil vapours. When handling gases other than air, the blowers can be fitted with mechanical shaft-seals, claimed to be more efficient than the stuffing box and gland used previously.

Loading Shovel

F. E. Weatherill, Limited, Tewin Road, Welwyn Garden City, Herts, announce the introduction of a new type of loading shovel. Known as the L.60 (Fig. 3), it was on show at the November Public Works Exhibition and is powered by a Fordson diesel engine with an S.A.E. rating of 62 b.h.p. at 2,250 r.p.m. The discharge height is 9-ft. 6-in., although it is possible to load over 11-ft. 6-in. The shovel incorporates a torque-converter with hydraulically-operated epicyclic gearbox and the drive to all four wheels is through final planetary reduction, with hydraulically-powered steering to the rear wheels. A number of hydraulic loading shovels, including the new L.60,

FIG. 1.—*"Acme" shakeout at a Leeds foundry, showing—arrowed—one of the two vibrator motors for imparting the up-and-down movement. (All "Acme" shakeouts are now available with Vibrator motors.)*

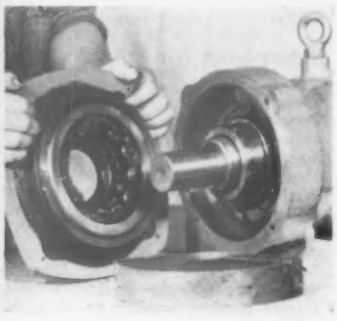

FIG. 2.—*Vibrator motor with the end-cover removed to show the large bearing size.*

FIG. 3.—*Weatherill's L.60 loading shovel in operation at Kingscliffe Super Refractories' plant in Northamptonshire.*

are now in operation for the loading of moulding sand and silica sand at quarries of Hinckleys, Limited, Sheffield. An example of the rate of working of the loader is provided by one company where it is stated that one machine loads an average of 600 to 700 tons per working day, and the tonnage could be increased if the chain of lorries could be made nearly continuous.

Angle-grinder

Wolf Electric Tools, Limited, Pioneer Works, Hanger Lane, London, W.5, have recently extended their range of portable tools by introducing a double-insulated high-speed angle-grinder—as a result, it is reported, of progressive research into the problems of users of depressed-centre grinding discs. It is claimed that the new design gives ease of control, the handles have a comfortable weight distribution, the changing of discs is simplified by the inclusion of a spindle-locking stud and the guard can be moved quickly to any required position around the discs. Model DI-J7 uses a 7-in. disc and DI-J9, a 9-in. disc, and both models can be fitted with cutting-off wheels for removing runners and feeder-heads. The input on a full load for both models is 1400 w., and the speed of the spindle (when running light) is 8,000 rpm. for model DI-J7 and 6,000 rpm. for model DI-J9; running on a full load, the speed of the spindle is 6,250 and 4,800 rpm. respectively.

Spray-gun for Dies

A hand spray-gun introduced by the Foundry & Metallurgical Equipment Company, Limited, Netherby, Queens Road, Weybridge, Surrey, which has been designed specifically for use with pressure-die-casting machines, provides the operator with an air jet for cleaning dies and an oil-mist spray to give efficient lubrication. Both jet and spray are independently operated and are applied at right angles to the die faces to allow penetration into deep cavities. Positioning of the gun is facilitated by swivel-joint connections of the flexible air- and oil-hoses. The gun can be supplied with either a single- or double-facing head. Each head carries a phosphor-bronze scraper blade for cleaning flash from the joint of the dies, and a suspension hook for hanging the gun between operations.

The gun is fitted with stainless-steel valves and has a single lever-action control giving immediate response. The density of the spray can be adjusted and then locked. The "Fame" hand spray-gun, available with tube lengths of 8 in., 12 in., and 18 in., is supplied complete with 1-gall. oil container with filter and hinged lid, and two 6-ft. lengths of armoured hose.

Magnetic-tube Tester

Rapid Magnetic, Limited, Lombard Street, Birmingham, 12, announce that they have acquired the exclusive licence to manufacture the Davis magnetic-tube tester. The unit, used for determining the magnetic content of ores, is said to be particularly suitable for checking efficiency of wet magnetic separators recovering magnetite and ferro-silicon in heavy media processes. It consists of an inclined glass tube set between the pointed poles of a powerful electro or permanent magnet. The ore sample is introduced into the water-filled tube and agitated in such a manner as to ensure thorough washing of the arrested magnetic material. The tester is continuously rated having a power consumption of 230 w.; overall dimensions are 28 by 26½ by 12-in., the net weight 280 lb., and gross weight 380 lb.

Drum Sanders

B. O. Morris, Limited, Briton Road, Coventry, announce the release of a new type of rubber drum sander for portable tools. This equipment employs centrifugal force to lock the band in position whilst in operation, yet grit changing can be performed in seconds, merely by stopping the handtool, slipping off one band and slipping on another, it is reported. The makers claim that the higher speeds employed are ideal for abrasive-cloth bands, resulting in improved cutting properties and faster production times. Slots behind the abrasive band introduce air, thereby assisting in cooling and thus helping to prolong both band and rubber life. Three sizes of drum sander are available—1-in. dia. by 1-in. wide by ¼-in. shank; 2-in. dia. by 1-in. wide by ¼-in. shank, and 4-in. dia. by 1½-in. wide and ⅜-in. shank.

Spherical Powders: A process for producing spherical powders of metals and metal alloys with particles ranging in size from 20 to 150 microns with a uniformity rate of 98 per cent., has been developed by Union Carbide Corporation of 30 East 42nd Street, New York 17, U.S.A. Six different powders available in limited quantities are:—copper, aluminium, nickel, 316 SS, tungsten, and Nichrome. A development programme is also under way on products with a particle size below 20 microns.

Multi-purpose Torch: British Industrial Gases, Limited, 700 Great Cambridge Road, Enfield, announce the introduction of a pressure welding or cutting torch, model 43. It operates on low, medium, or high-pressure fuel-gas, using acetylene, propane, butane, hydrogen or town gas, and can, it is stated, be used for welding, cutting, heating, flame cleaning, or gouging.

Ferro-chromium: "Simplex" low-carbon ferro-chromium for the manufacture of very-low-carbon stainless-steel is now available jointly from Union Carbide, Limited, and London & Scandinavian Metallurgical Company, Limited. The specification of the material runs: Maximum 0.01 per cent. carbon, maximum 2 per cent. silicon, and 68 to 71 per cent. chromium.

Personal

Mr. JOHN HOLLINGS, chief designer of Rolls-Royce and Associates, Limited, has been appointed a director.

MR. JOHN GODFREY NOBLE, chief engineer, Snow & Company, Limited, Sheffield, has been appointed a special director and will hold the position of works director.

To mark his retirement after 55 years' service, Mr. J. PAIN, production manager, Bellis & Morcom, Limited, Birmingham, received a pair of binoculars from the works director, Mr. F. V. EVERARD.

Two employees of Hall & Pickles, Limited, Ecclesfield, Sheffield, Mr. J. H. SMITH and Mr. A. SPENCER have been presented with gold wrist watches in recognition of 25 years' service with the company.

Dr. S. C. CURRAN, principal of the Royal College of Science and Technology, Glasgow, has accepted an invitation to serve for a period of five years on the research grants committee of the Department of Scientific and Industrial Research and on the technology sub-committee of the research grants committee.

Mr. TOM DAVISON has retired from the post of mills manager and chief roll designer wtih the Lanarkshire Steel Company, Limited, Motherwell, after 35 years with the Colvilles group. He joined the Glengarnock Steel Works in 1925 and in 1938 was transferred to the Lanarkshire works as roll designer, being later promoted mills manager.

Mr. J. B. BIRD retired as managing director of Malleable, Limited, (a subsidiary of H. W. Lindop & Sons, Limited, Walsall) in the middle of 1960 after 46 years' service and at a staff dinner of the Lindop group of companies held on December 9, he was presented with a gold watch by the chairman, Col. C. A. B. LINDOP, O.B.E., D.L., J.P.

Mr. R. D. POLLARD, a director and chief metallurgist at Samuel Fox & Company, Limited, Stocksbridge, Sheffield, has been appointed director of metallurgy. Mr. R. WILCOCK, works metallurgist, has been appointed to the post of chief metallurgist, responsible to the director of metallurgy for the management of the company's metallurgical department.

Mr. DENNIS A. LAVERACK, area manager for Yorkshire of the Electric Construction Company, Limited, relinquished the post on January 1 for health reasons. He will continue to act in a consultative capacity within the area. Mr. E. J. HASLOCK, who became assistant to Mr. Laverack in Leeds in July, 1958, succeeds him as area manager.

Mr. ARCHIBALD M. DAWSON has been appointed assistant general manager of Lancefield Foundry Company, Limited, Glasgow, a subsidiary company of David Rowan & Company, Limited, marine engineers, Glasgow. Mr. Dawson joined David Rowan over 15 years ago as an apprentice fitter and at the time of his new appointment was their development engineer.

Mr. CYRIL E. LLOYD has retired from the board of N. Hingley & Sons, Limited, and has been appointed first president. He has been with the company for 53 years and was chairman from 1918 until the beginning of 1959. Mr. P. JUMP and Mr. J. L. GRAINGER have also retired from the board and Mr. E. PAGETT and Mr. E. T. ELWELL have been appointed directors.

Mr. I. S. WHITEMAN has been appointed to the board of NCK-Rapier, Limited, London, the sales organization for the excavators and cranes made by Newton Chambers & Company, Limited, at Thorncliffe, Sheffield, and by Ransomes & Rapier, Limited, at Ipswich. He continues as general manager, the position he has held since the formation of the company at the beginning of 1959.

Wadkin, Limited, woodworking-machinery manufacturers, Leicester, announce the following board changes: Mr. C. H. MORRIS, managing director retired on January 1, but retains his seat on the board as vice-chairman, Mr. S. RADCLIFFE and Mr. W. L. SIMMS become joint managing directors, and Mr. W. J. O. HOWE and Mr. PHILIP H. MORRIS have been appointed directors.

Mr. A. F. PATES, managing director of the Derbyshire Carriage & Wagon Company, Limited, has been appointed chairman of the company in succession to Mr. WILLIAM RICHARDS, who has resigned after being a director and chairman for the past 18 years. Mr. Richards was a founder member of the company in 1913. Mr. Pates has been managing director of the company since 1933.

Mr. ALLAN BLAIR, longest serving member of the Wallacetown Engineering Company, Limited, Ayr, has retired after nearly 38 years' service with the firm. His colleagues presented him with a wallet of notes, and he received a cheque from the firm. Mr. Blair started work with the firm when only nine men were employed; now there are more than 200. He was employed as a turner.

On completing 40 years' continuous service with Mather & Platt, Limited, Manchester, Mr. EDWARD JOHN LEES HOWARD, has been presented with a silver teaset. He has been chief metallurgist with the company since 1923 and is a past-president of the Lancashire section of the Institute of British Foundrymen. He is due to retire in February, but will continue in an advisory capacity.

United Coke and Chemicals Company, Limited, a subsidiary of the United Steel Companies, Limited, announce the following two new appointments, with effect from January 1: Mr. J. H. SELLARS, previously work-study officer, has been appointed works manager (services). Mr. R. C. LIMB, who rejoined the company some months ago as assistant work-study officer, has been promoted to work-study manager.

Crofts (Engineers), Limited, Bradford, announce that, following recent alteration of the company's articles of association authorizing the appointment of sectional directors, four executives of the company have now been promoted. They are Mr. H. GOLDTHORPE, works director; Mr. C. MASON, branch works director; Mr. A. HEARN, production control director, and Mr. S. W. BALL, foundry control director.

Mr. R. CLARKE, marine sales manager, has resigned from the board of Laurence Scott & Electromotors, Limited, for health reasons, after 48 years' service with the company. Mr. J. B. WORMALL, formerly industrial sales director, is now sales director for all the company's products. Mr. J. CALLF has become marine sales manager, and is succeeded by Mr. B. KIDD as chief estimator of the marine department.

E. Boydell & Company, Limited, of Old Trafford, Manchester, announce the appointment of Mr. B. N. JOLLY as managing director to succeed the founder of the company, Mr. E. BOYDELL, who will remain as chairman. Following the acquisition of the equity of the company some 12 months ago by Winget, Limited, Mr. R. DUCAS, chairman of Winget and Mr. E. F. O. GASCOIGNE, deputy chairman, are also joining the Boydell board.

Mr. C. R. WHEELER, C.B.E., chairman of Guest Keen Iron & Steel Company, Limited, additional vice-

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chairman of Associated Electrical Industries, Limited, and a director of the Steel Company of Wales, Limited, has succeeded Mr. R. F. SUMMERS, chairman, John Summers & Sons, Limited, as president of the British Iron and Steel Federation. Sir JULIAN PODE, managing director of SCOW, has been appointed president-elect of the Federation.

Dr. ESMOND W. SMITH has retired as an advisory director of Submarine Cables, Limited, jointly owned by Associated Electrical Industries, Limited, and British Insulated Callender's Cables, Limited. Mr. ALBERT G. FULLER has been appointed secretary of Submarine Cables in place of Mr. WILLIAM F. NORTH who has relinquished that position to take up an appointment with BICC as personal assistant to the general overseas manager.

Mr. B. POWELL has been appointed chairman of Enfield Cables, Limited, in place of the sixth EARL OF VERULAM who has resigned from the board. Lord Verulam remains chairman of the parent company, Enfield Rolling Mills, Limited. Mr. D. J. HASTINGS has been appointed a director of Enfield Cables. Mr. W. W. KEE has been appointed an additional director of Enfield Rolling Mills. Mr. R. J. SMITH has been appointed secretary of that company.

Mr. JULIUS TRUP has been appointed chairman of S. Guiterman & Company, Limited. He has relinquished his seat on the board of B. Elliott & Company, Limited, and its subsidiaries. B. Elliott acquired from S. Guiterman its machine-tool sales division known as Mortimer Engineering, Limited, in June. Mr. DUNCAN MCINTOSH, deputy managing director of North Central Wagon and Finance Company, Limited, has been appointed a joint managing director as from January 1.

Mr. S. BARRACLOUGH, metallurgist with the United Steel Companies, Limited, Sheffield, left Britain on January 5, for three months in India to advise the Indian Government on steel standards and specifications. The visit is under the technical co-operation scheme of the Colombo Plan, which provides training for technicians from under-developed countries and arranges for experts to visit various countries. Mr. Barraclough spent six months in India in 1959 on a similar mission.

Mr. B. P. R. PARSONS, previously managing director of Bound Brook Bearings, Limited, Lichfield, has been appointed chairman of the company and has also been made a director of the parent company, Birfield, Limited. The previous chairman of Bound Brook, Mr. H. E. HILL—who is also chairman of Birfield, Limited—will remain as vice-chairman. Mr. T. L. MARTIN, formerly administration director, becomes director and joint manager (commercial) and Mr. W. HARRIS, previously works director, is appointed director and joint general manager (works).

Mr. C. G. JAMES has been appointed managing director of Fairey Marine, Limited, in succession to Mr. C. H. CHICHESTER SMITH, who retains the chairmanship. Mr. James has been manager of the company's works at Hamble since July, 1958, and was elected to the board in February, 1959. Mr. A. R. SIBLEY, works manager and works superintendent at Hamble, and Mr. CHARLES CURREY, Fairey Marine sales manager, have been appointed directors of Fairey Marine. Mr. Chichester Smith is also managing director of the Fairey Company, Limited, the parent company of the Fairey group, and chairman of Fairey Engineering, Limited.

News in Brief

Mr. E. S. D. HART and Mr. A. MOORHOUSE have been appointed to represent Richard Baxendale & Sons, Limited, ironfounders, Albert Street Foundry, Chorley, Lancashire, in the southern, central and East Anglia area and south-western area respectively.

FIRTH CLEVELAND GROUP have acquired the lease of 7, Cleveland Row, St. James's, London, S.W.1, a large block of offices adjacent to the group's headquarters at Stornaway House, Cleveland Row. The new offices will be occupied by the home sales divisions of Simmonds Aerocessories, Limited, Firth Cleveland Instruments, Limited, and Surform (Firth Cleveland Tools, Limited) and home and export sales departments of British Lead Mills, Limited, Seculate, Limited, and Richard Hill, Limited.

THE 100-YEARS-OLD FIRM of William Hooton, Limited, lace-machine builders, of Great Eastern Street, Nottingham, is to close down, on January 31. The main reason for the closure is due to the failure of the lace industry, to support a new lace-making machine—The Lacemaker—on which the company has spent over £25,000 to perfect in the last ten years. It is understood that the Patent has been sold to Spowage, Humphreys and Wyer, Limited, machine builders, of Portland Road, Nottingham.

UNDER SECTION 21 of the Finance Act, 1948, as amended, the Treasury have made an order (entitled the Purchase Tax (No. 5) Order, 1960), (Statutory Instruments No. 2351), exempting from tax under group 12 of the purchase-tax schedule electrically-operated appliances for central-heating systems, using in winter not less than 30,000 British thermal units per hour. Copies of the Order are obtainable (price 3d. net, by post 5d.) from HM Stationery Office, York House, Kingsway, London, W.C.2, and branches.

DISTINGTON ENGINEERING COMPANY, LIMITED, Workington, has received an order worth over £1,000,000 from the German firm of Schloemann A.G. of Düsseldorf, for a billet line and rod mill to be installed at the Scunthorpe works of Appleby Frodingham Steel Company, Limited. The Workington company's current orders include three continuous casting plants, one of which is for India, furnace bodies for the new Steel, Peech & Tozer electric-arc furnaces, and a universal mill for Appleby Frodingham.

A "25 YEAR CLUB" was inaugurated in December last at a dinner at the Sheffield works of Keeton, Sons & Company, Limited. Membership is open to all employees who have completed 25 years service with the firm, and at the first annual dinner the first 13 members were presented with gold watches. Number 14 in the club is Mr. Albert Whittaker, managing director (who made the presentations), he has been with the firm since 1920. Keetons are known for plate and sheet metal-working machinery, hollow bored bars and large hydraulic cylinders.

BY MUTUAL ARRANGEMENT between the Board of Trade and the Czechoslovak Ministry of Foreign Trade, it has been decided that the quotas for trade between the two countries, for which provision was made in the Anglo-Czechosolvak trade agreement of April 13, 1960, for the calendar year 1960, should be extended, on a proportionate basis, for a period of three months from January 1, 1961. The purpose of the arrangement is to tide over trading facilities between the two countries pending the completion of discussions on quotas by their respective representatives.

T. REDMAYNE & COMPANY, LIMITED, ironfounders, Little London Road, Heeley, Sheffield, celebrated their centenary with a cocktail party on December 27 at

the Grand Hotel, Sheffield. The firm started in 1860 in a carpenter's shop in Rotherham. It moved to Sheffield in 1875 and became an iron foundry, employing craftsmen for hand moulding. One of its principal activities at the present time is the recovery of non-ferrous metals. The directors are Mr. Geoffrey Redmayne, grandson of the founder, and his sisters Miss Beryl Redmayne and Mrs. Rose Hurst. Among the firm's employees, two, Mr. H. C. Hobson and Mr. F. Witham, have been with the firm for over 50 years.

Sir PETER ROBERTS, M.P., chairman of Newton Chambers & Company, Limited, Chapeltown, Sheffield, in a New Year message to employees, forecasts that there will be a rising tempo of production at home and a more peaceful approach to world problems abroad. He says, "There are great opportunities and it is up to us to see that they come our way." 1960 was not an easy year, states Sir Peter, but the group had continued with the policy of pressing on with new designs and ideas. "We have had to face keen competition, and I have no doubt that we shall do co-operation which I know exists in the group, I am so in the future, but with the spirit of teamwork and confident we shall overcome all obstacles.

FIVE REPRESENTATIVES of Stanton Ironworks Company, Limited, near Nottingham, are to leave for Canada within the next few weeks to supervize the opening of one of Canada's first spun-iron-pipe plants, which represents an initial investment of more than $5,000,000. Previously the Stanton Company has had only a marketing company, Stanton Pipes, Limited, at Hamilton, Ontario, but now pipes will be manufactured there on an extended site. It is expected that the English team will remain in Canada for about six months, with the exception of Mr. Denis West, at present assistant to the general manager in the spun-iron section at Stanton, who will become plant manager at Hamilton and is likely to remain there for two to three years.

THE BOARD OF DIRECTORS of Saunders Valve Company, Limited, announce that they are negotiating with the Netherlands Authorities for the establishment of a branch of business in Leeuwarden, Friesland. The premises to be built will have initially a floor area of 10,000 sq. ft. and provide warehouse and assembly facilities and eventually production of certain lines. The purpose of the new venture is to provide improved service to the company's outlets in the European Common Market. This decision will in no way affect the level of employment at the company's head office and principal works in Cwmbran and Newport, Monmouthshire. Further developments to increase production at both these factories are under consideration.

EMPLOYERS AND TRADE UNION LEADERS from centres of the motor industry in the Midlands—Birmingham, Coventry and Oxford—reached broad agreement at a conference in Birmingham at the end of last month, on proposals to institute a scheme of staggered holidays in 1962. The scheme is based on bringing forward the two-week summer holidays to the middle of July. The proposals discussed at the conference were the outcome of a series of meetings held to seek a solution to demands from industrial employees that earlier holidays should be arranged to ease traffic congestion and accommodation problems. It has now been suggested that the holiday date for Midland car workers in 1962 should be July 13-30, a fortnight earlier than usual. The recommendations are being submitted to the Engineering Employers Federation and the Confederation of Shipbuilding and Engineering Unions at national level, to companies not federated and to the education authorities.

AT THE NEWS CONFERENCE following the meeting of the Midland Regional Board for Industry in Birmingham last month, Major C. R. Dibben, chairman of the Board, forecast that the recession in industries hit by the credit squeeze, especially the motor industry, is likely to reach a critical point in the first two months of this year. He said the Board concluded that "industry as a whole in the Midlands, in common with the rest of the country, faces a pause in the upward trend—but with no indication of anything approaching the beginning of a general recession." He added that this view did not minimise the effects of the recession in the motor industry where short-time working involved nearly 73,000. However, in spite of redundancies, the number of persons registered as wholly unemployed in the Midlands had increased only by some 600 between September and November. Unfilled vacancies still amounted to almost 39,000. Mr. C. J. German, Regional Controller for the Ministry of Labour, reported that out of 687 workers made redundant at two motor-accessory firms in late November, only 74 were still registered as out of work and redundant skilled workers were being absorbed "readily and easily."

Obituary

A former director of C. H. Pugh, Limited, Birmingham, Mr. E. W. STARKEY, has died at the age of 82. Mr. Starkey had completed 59 years service with the company when he retired in 1955, and was awarded the MBE in 1944 for his industrial work during the two world wars.

Mr. HAROLD GODFREY JUDD, C.B.E., died early this week. He was the senior partner of Mann, Judd & Company, chartered accountants, and during both world wars held important Government posts. At one time, he was secretary of the National Ironfounding Employers' Federation, a position now held by his son.

The death on Monday last is announced of Professor A. Campion, F.R.I.C., aged 87. During his long period with the Glasgow Technical College (now the Royal College of Science and Technology) he was also active in establishing and fostering the Scottish branch of the Institute of British Foundrymen, which he joined in 1911. He was an Oliver Stubbs medallist of the Institute, a past-president of the Scottish branch, and in 1918 was elected an honorary life-member.

Proprietor of the New Rock Foundry, Blackwood, Mon., and probably the oldest ironfounder in Wales, Mr. TOM BROWN died in December at the age of 93. Mr. Brown who started work as an iron moulder in the second half of the last century, left the industry for several years for the haulage business until some time in the 1940's when he founded his foundry in Blackwood. He was actively engaged in this business until the early part of last year. The foundry is now being carried on under the supervision of his son.

Mr. ALBERT ELLIS, of Eastbourne, who retired in 1954 after 50 years with Peglers, Limited, brassfounders, of Belmont Works, Doncaster, has died at the age of 75 in hospital in London. He began his career with the company in 1904, when the Doncaster works were opened, and subsequently became sales manager. From 1938 to 1948 he was managing director, and from 1947 until he retired in 1954 he was chairman of the company. He was a past-president of the National Brassfounders' Association and the first president of Doncaster Chamber of Trade (manufacturers' section).

Publications Received

Durgapur—a Technical Survey. Published by *Iron and Coal Trades Review*, 17-19, John Adam Street, Adelphi, London, W.C.2; price £1 1s.

This account has been prepared in collaboration with the Indian Steelworks Construction Company, Limited. In general, the 350-page book is divided into two sections, the first carrying a series of articles from outstanding people who were intimately concerned with the carrying out of the project. An article by Mr. G. Pande, chairman, Hindustan Steel, Limited, is especially interesting, as it gives an overall picture of the Indian sub-continent's iron and steel developments and tabulates the major items of the work being done at various locations by German, Russian and British contractors.

The second section covers such subjects as Durgapur works layout and design, plant selection and installation, construction on the site and manning of the works, these being again divided into 26 separate sections with detailed descriptions of the blast-furnaces, coke ovens, steel furnaces, rolling mills, foundries* and power plant. Of interest to the general reader, is the chapter on the administrative buildings and here details are given of the various laboratories, canteens, ablution centres, etc. This book covers what is a veritable revolution in a country's outlook and industrialization in a fantastically short time, the end of which is not yet in sight. However, it is clearly shown in the book that a propitious start has been made, and the whole publication well reflects enormous achievements resulting from the co-operative efforts of all concerned.

The First Twenty-five Years. Published by the Star Aluminium Company, Limited of Wolverhampton and Bridgnorth.

The Star Aluminium Company, Limited, as part of its silver jubilee celebrations has issued a very fine brochure. The firm manufactures a full range of aluminium foils and its association with the foundry industry is mainly in the personnel of the founders of the company and its present board of directors. The company was founded by Mr. Frank Hurst and Mr. F. M. Osborn in association with Mr. F. Respinger of Laminoirs d'Aluminium S.A. Schaffhouse. During 25 years' existence, the company's monthly production of aluminium foil has increased from 20 to over 500 tons per month—a prodigious output. The brochure shows, *inter alia*, how aluminium foil is produced and just what industries absorb the material. The JOURNAL congratulates those responsible for this well-produced and very interesting brochure.

Metal Statistics 1950-1959—47th annual issue—on aluminium, lead, copper, zinc, tin, cadmium, magnesium, nickel, mercury and silver. Published by Metallgesellschaft AG, Reuterweg 14, Frankfurt am Main, Germany.

The survey of the metal industry, which opens this 250-page book, carries an interesting table giving a breakdown of production of non-ferrous metals in the countries of the European Economic Community, the European Free Trade Association, the USA, and the Soviet sphere, the percentage increases in 1959 over the 1950 figures being 60.4, 46.2, 24.2, and 182.0 respectively. The latter figure which covers the Soviet sphere indicates the great progress made beyond the "iron curtain." A further table gives the consumption of non-ferrous metals in the same areas as before, where the percentage increases on 1950 figures are 98.7, 29.4, 18.8, and 151.6 respectively. The figures detailing UK production, imports and exports, of these metals, and also re-melted alloys will be of distinct interest to those concerns manufacturing and merchanting these base metals. The book is well known and, being printed in English, will be highly esteemed by recipients.

Drilling Cast Iron. Published as Report No. 39 by the Production Engineering Research Association of Great Britain, Melton Mowbray, Leicestershire; price 7s. 6d. post free.

This report gives full details of the first of a series of tests being carried out by the Production Engineering Research Association to determine the most suitable drill-point shape for drilling various materials. The clear sketches and illustrations included in the report—which is concerned with grey cast iron—are very helpful in the application of the recommendations set out.

Dorman Long Illustrated, 1960. Published by Dorman Long & Company, Limited, Zetland Road, Middlesbrough.

In the past, this company used to publish annually a statement for their employees. Whether this publication is meant to replace the former booklets, the reviewer is unaware. Some of the same ground is covered by this brochure, but not all. The accomplishments of the year are set out in a series of annotated pictures and short articles, and one of these outlines the company's £36,000,000 development programme. Altogether, it is an interesting publication.

Investment in the Community Coalmining and Iron and Steel Industries—Report on the 1960 Survey (as at January 1, 1960). Published by the European Coal and Steel Community.

This survey, dated September, 1960, is the eighth of the series. It records that expenditure in most sectors of the European Coal and Steel Community touched a peak in 1957. The forecasts for the coming years are reasonably optimistic, that for steel being 81,900,000 *tonnes* in 1963. The forecast for hard-coal extraction indicates somewhat static conditions, owing presumably to competition from oil and natural gas.

This is TI To-day. Published by Tube Investments, Limited, The Adelphi, London, W.C.2.

This booklet lists all the various subsidiary companies of Tube Investments, Limited, divided into groups according to the products they make. The classification does not list foundries separately, but amongst them are Renishaw Iron Company, Limited, William Mills, Limited, and Magnesium Elektron, Limited.

Choice of Careers No. 36—the Blacksmith. 2nd edition. Published by HM Stationery Office, York House, Kingsway, London, W.C.2; price 1s. 9d. post free.

This issue is devoted solely to a well-balanced, illustrated account of what it means to be a blacksmith. It is one of the few really skilled crafts and one that must be satisfying to those successfully practising the art.

Mr. W. WILLETT has been appointed sales representative for David Rowan & Company, Limited, and for its subsidiary, Rankin & Blackmore, Limited, marine engineers and boilermakers, Greenock.

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* See page 35 of this issue of the JOURNAL.

Acknowledged, with thanks . . .

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H. W. KEARNS & COMPANY, LIMITED—Mr. S. H. L. Kearns has joined the board.

Success of Dundee Venture

Dens Metals (Dundee), Limited, a new bronze-casting concern recently launched by the local jute firm of Malcolm, Ogilvie & Company, is progressing satisfactorily, it is reported. A substantial export order has already been booked, and plans for expansion of production are in hand. The new Dundee product is obtained by a process of continuous casting in solid bar or tube form in lengths up to 9 ft.—in contrast to the roughly cylindrical bars in short lengths obtained by the traditional method of casting bronze for machining into bushes, gear wheels, etc. The plant, which is believed to be the only one in Scotland, has been installed to the specification of Prof. E. C. Ellwood, of the Royal College of Science & Technology, Glasgow, who is associated in the development in conjunction with Malcolm, Ogilvie & Company. The machinery is meantime housed in a section of the jute firm's premises, but the new company will eventually be operating under one roof as a self-contained unit. A completely separate portion of the works adjacent to Dens Road has been set aside for the installation of a pilot plant.

Copper Research

The Copper Products Development Association, Inc., 25 Broadway, New York 4, NY, USA, has approved research proposals totalling in excess of $132,000 as the initial phase of its 1961 programme and is now entering into contract arrangements with six additional research organizations for conduct of the work. These organizations are: Armour Research Foundation, Chicago; Applied Research Laboratory, University of Arizona, Tucson; Battelle Memorial Institute, Columbus, Ohio; Franklin Institute Laboratories, Philadelphia; Fulmer Research Institute, Stoke Poges, England; and Stanford Research Institute, Palo Alto, California. The only research project of direct interest to the industry among these new contracts is that to be awarded to the Fulmer Research Institute. This organization will make a study of the effect of copper on the corrosion resistance of pearlitic cast iron by sulphuric acid. The objective here is to develop information that possibly could lead to increased use of copper-bearing irons in diesel engines and other places where sulphur-bearing fuels are used.

ISI Annual General Meeting

Technical sessions devoted to the use of computers in the iron and steel industry and to the Brymbo oxygen steelmaking process, and a joint symposium with the Institute of Metals on structural processes in creep are scheduled for the annual general meeting of the Iron and Steel Institute to take place in London on May 3 and 4.

Sir Charles Goodeve, O.B.E., F.R.S., director, British Iron and Steel Research Association, is to be installed as president of the Institute during the meeting, and will deliver his presidential address on the morning of Wednesday, May 3. In the evening, he will take the chair at the annual dinner for members to be held at Grosvenor House, Park Lane, London. The formal business and sessions on computers (which will be under the aegis of the British Conference on Automation and Computation) and oxygen steelmaking will take place at the Institution of Mechanical Engineers, Birdcage Walk, London, S.W.1. The joint symposium on creep will be held at Hoare Memorial Hall, Church House, London, S.W.1.

Company News

W. H. ALLEN SONS & COMPANY, LIMITED, mechanical, hydraulic and electrical engineers, of Bedford—The 1960 interim payment is being raised from the equivalent of 1¼ per cent. to 2½ per cent.

GLOUCESTER RAILWAY CARRIAGE & WAGON COMPANY, LIMITED—Gen. Sir William Morgan, the chairman, said last week that he had not been approached by any take-over bidder. Rumours of a take-over sent the 10s. shares up to 14s. on the Friday before last.

FREDERICK BRABY & COMPANY, LIMITED, structural engineers and metal workers, of London, E.C.1.—Dividend of 5 per cent. is maintained for the year ended September 30, 1960. Group trading profit was £202,906 (£57,320 for the parent company only) and the net loss is £55,792 (£172,576).

WILKINS & MITCHELL, LIMITED, machine-tool manufacturers, of Wednesbury (Staffs)—Interim dividend on account of the year ending March 31, 1961, is cut to 4 (7) per cent. Profits for the year will show a very substantial reduction from the record results of 1959-60, it is stated. The 1959-60 final dividend was 14 per cent.

CHURCHILL MACHINE TOOL COMPANY, LIMITED—Sir Greville Maginness, the chairman, says that taking all factors into consideration, and having taken financial advice, the directors have no hesitation in recommending holders to accept the offer worth £8,400,000 for the capital made by the Birmingham Small Arms Company, Limited.

FIRTH CLEVELAND, LIMITED—It is proposed to create 4,000,000 £1 preference shares, making the authorized capital £10,000,000, and to give the directors the power to issue further preference shares with such rights as they may think fit. The additional capital is needed mainly as a result of the acquisition of the Solartron Electronic Group, Limited, Broadmead, Limited, and J. J. Habershon & Sons, Limited, early in 1960.

ASSOCIATED ENGINEERING HOLDINGS, LIMITED—announce an increased dividend, a one-for-two scrip issue and sharply increased profits. Final dividend for the year to September 30, 1960, is 15 per cent. making 20 (17½) per cent. for the year. Group net profits have risen to £1,882,836 (£1,523,506). The directors emphasize that the scrip issue, capitalizing £2,649,002 of reserves, must not be taken as implying any increase in the distribution in the future.

GAS PURIFICATION & CHEMICAL COMPANY, LIMITED—Following a dispute, Vice-Admiral Sir Charles Hughes Hallett, the chairman, and Mr. W. J. Arris, a director, have resigned. Sir Charles said that for some time he had been convinced that it was in the best interests of the company to strengthen the board by appointing three new directors with wide general experience to fill existing vacancies. The board did not accept that view. Mr. Arris resigned in support of Sir Charles's conviction.

WOLVERHAMPTON DIE CASTING COMPANY, LIMITED—Resolutions to increase directors' remuneration and to create 9,000,000 2s. ordinary shares were passed at the recent annual meeting. Mr. W. C. Sproson, the chairman, remarked that some shareholders seemed to be against granting the directors an increase from the 1937 figure of £300 a year each to £750 a year and the chairman one from £400 to £850 a year. The 1937 figures, it was stated, bore little relation to the board's present-day duties.

COVENTRY GAUGE & TOOL COMPANY, LIMITED—Final dividend of 6¼d., tax free, per 10s. ordinary makes 9d. per share for the year ended August 31, 1960, against 7½d. net per unit. A one-for-four rights issue is also proposed towards the end of January to provide extra working capital. After tax and depreciation, the group net profit amounts to £219,721 (£181,250). The directors state that the results do not reflect the expansion in the order-book, which is considerably higher than a year ago.

ATLAS STEEL FOUNDRY & ENGINEERING COMPANY, LIMITED—Orders on hand have increased during the last three months over the corresponding months of 1959, but Mr. A. C. Strathie, chairman, warns that until the shipbuilding and heavy electrical industries recover, the company must depend on general work and lower profit margins. The depressions in those two industries accounted for a drop in net profits from £142,925 to £98,550 and meant that more general engineering work had to be undertaken at lower prices.

BRUCE PEEBLES & COMPANY, LIMITED, manufacturing electrical engineers, of Edinburgh—Conversations have been taking place between the board and the directors of Belmos Company, Limited, colliery and industrial switchgear manufacturers, of Bellshill (Lanark), with a view to a merger between the two companies, states Mr. S. A. Gaskell, chairman. Some time must elapse before details are available, but stockholders will be kept advised. The board has confidence in Belmos. The order-book position is satisfactory and the rate of order intake encouraging, it is stated.

Shipbuilding Outlook

Colonel T. Eustace Smith, chairman of Smith's Dock Company, Limited, North Shields, has reported that on the shipbuilding side there is work in hand to cover the present financial year, but after that there are gaps in the programme which will prove difficult to fill. A contract was cancelled for an ore-carrier on which work was due to have started early in 1962. It has been difficult to secure profitable repair work.

It had been previously announced that the board had decided not to carry out the dock-extension scheme outlined a year ago. Now it has been decided that liquid funds would be better spent in providing additional plant and services at both yards to increase efficiency and reduce costs. Since the second world war, £3,800,000 has been spent on improved facilities, £3,000,000 of it out of retained profits. Colonel Smith said that there was little real indication of the end of the shipping recession which had been going on for three years. The company had a net profit of £364,830 in the year ended September 30, compared with £427,892 in the previous year.

Jones Crane Photographic Competition

George Cohen 600 Group, Limited, organizers of the Jones Crane Photographic Competition (closing date for entries was December 31, 1960), announce that the four members of the judging panel will be as follow:—Mr. A. L. M. Sowerby, Editor of the *Amateur Photographer;* Mr. Percy R. Levy, M.A.(CANTAB)., a director of the group; Mr. E. Goodwin chief staff photographer of George Cohen's, and Mr. P. Hodge, chief staff photographer, K. & L. Steel founders & Engineers, Limited. The judges final decision will be published in April, 1961. The total prize money amounts to 600 guineas, divided into a first prize of 250 guineas; second, 100 guineas; third, 75 guineas; fourth 50 guineas, and five consolation prizes of 25 guineas. The best photograph sent in each month since the competition was launched has qualified for a special five-guinea award.

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Raw Material Markets

Iron and Steel

Many of the ironfoundries are hoping for an increase in business during 1961, as at present they are working well below capacity levels. Chief among these are the engineering and speciality foundries which supply castings to the motor car industry. In common with other ancillary trades, most of the ironfoundries which cater for the motor industry, particularly those which supply mainly to them, continue to obtain reduced outputs on account of the recession, and in some instances short-time working has been enforced. The vehicle and tractor side of the motor industry continues well occupied, and its usage of high quality castings provides a reasonable amount of work for the foundries supplying these. Good demands for castings also continue to be made from the heavy engineering trade, power and electrical plant manufacturers, machine tool makers, and others, and overall outputs of high quality castings are at fairly substantial levels.

Of the light foundries, those catering for the domestic utensil trade continue short of work. The foundries supplying light castings to the building trades continue to fare much more favourably, and are obtaining reasonably good outputs. The jobbing and textile foundries are fairly well employed but could undertake more work.

The supply of all grades of foundry pig-irons is plentiful and no difficulty is experienced in obtaining the required tonnages. Fairly substantial demands continue to be made for the low phosphorus irons, and overall outputs are more than adequate to satisfy present needs. Hematite and refined irons are also available to meet requirements. The supply of scrap is becoming more difficult, particularly in the better qualities of both cast-iron and steel. Special grades are scarce. Foundry coke deliveries are satisfactory and ganister, limestone, and firebricks are readily obtainable.

The re-rollers began the New Year with good order-books, which has enabled them to continue satisfactory outputs. Although for some of their products demands are not now so heavy, due again to the recession in the motor industry, overall there is a good call for their outputs of small bars and light sections, and for reinforcing rods the demand is sustained at high levels. The re-rollers are well provided with steel semis in the mild steel grades, and home steelworks continue to send forward substantial tonnages. There is still a scarcity of carbon and alloy steel billets. Arisings at the steelworks of suitable defectives and crops are readily taken up.

Non-ferrous Metals

Whether or not the state of the lead market will bring more effective control is in the lap of the gods, but there is no doubt that there is a widespread feeling that more effective control is needed. Stocks, during 1960, increased by an estimated 75,000 tons, in spite of the world consumption being fairly well maintained, and prices recently touched the lowest point in 14 years.

Australia and Canada are playing a prominent part in supporting the market, but what is happening elsewhere is anybody's guess. Spanish imports into the UK, for instance, have done much to depress the price of lead on the London Metal Exchange.

London spot metal price averages for the past year, compiled by the Metal Bulletin, are noteworthy. Prices a few days ago, with the 1960 averages in parentheses, are as follow:—Copper, £224 (£246); tin, £788 (£797); lead, £64 (£72); zinc, £81 (£89).

The trouble at the El Teniente copper mine has served to cause the price to fluctuate during the past week. The news on Monday was that union leaders had called a strike to begin on Tuesday, but it was learned later in the day that a settlement had been reached and prices consequently reacted sharply downwards. Both price positions on the LME lost £4 10s. a ton.

The recent rise in refined copper stocks was reversed last week when the tonnage in LME official warehouses fell 175 tons to 14,159 tons. Tin stocks, however, continued their upward trend, the total gaining 144 tons more to 9,710 tons, London standing at 4,285 tons. Demand for tin has lagged noticeably and the market is generally dull.

The confusion in the US market had sharp repercussions in this country causing the price of zinc to fall sharply. The downturn was particularly pronounced for cash which lost 25s. a ton to narrow the backwardation to around 30s.

House Organs

Cement Special, Vol. 1, No. 1. Published by Lafarge Aluminous Cement Company, Limited, 73, Brook Street, London, W.1.

This is to be a quarterly publication written in the interests of overseas countries. Especially interesting in this issue is an article which tells of the early history and development of Ciment Fondu, which product the company now sells in 64 countries.

EFCO Journal Vol. 1, No. 5. Issued by EFCO Furnaces, Limited, Queens Road, Weybridge, Surrey.

This issue carries a very interesting account of the Wealden iron industry by Mr. O. A. Goulden. The rise and decline of this industry is detailed and its significance to developments is clearly shown. Other articles cover the heat-treatment of ferrous metals, annealing of case crankshafts, and heating with immersed electrodes.

Nickel Bulletin, Vol. 33, No. 11. Issued by Mond Nickel Company, Limited, Thames House, Millbank, London, S.W.1.

Abstracts in this issue are concerned with nickel-containing heat- and corrosion-resisting materials; extraction refining, determination and analysis of nickel, and graphitization in nickel-containing cast irons. The properties of structural steel suitable for use in such low-temperature applications as the containment of liquefied gasses are also dealt with.

Albion Works Bulletin Vol. 14, No. 2. Issued by John Harper & Company, Limited, Willenhall, Staffs.

This issue notes the retirement of Mrs. S. Haynes after completing 61 years' service with the firm. For many years, she was forewoman of the coreshop, but latterly was in charge of the staff tea room. It is recorded that at a meeting of the company's joint production committee, members expressed their appreciation of the system of identifying the various grades of molten metal ladles by the use of lettered discs. An improvement envisaged was the use of punched letters on the discs as painted letters soon became difficult to decipher.

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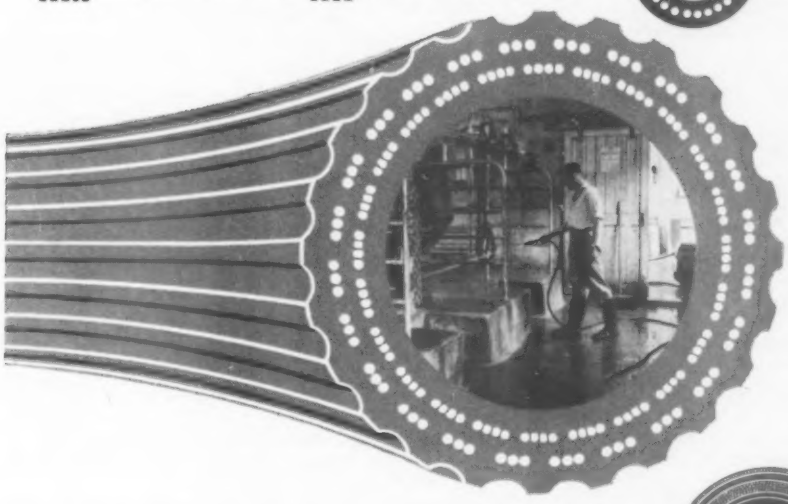

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Current Prices of Iron, Steel, and Non-ferrous Metals

(Basis prices, delivered unless otherwise stated)

January 11, 1961

PIG-IRON

Foundry Iron.—No. 3 IRON, CLASS 2, 10-ton lots or over: Middlesbrough, £21 17s. 0d.; Birmingham, £21 9s. 3d.

Low-phosphorus Iron.—Over 0.10 to 0.40 per cent. P 10-ton lots or over, £23 5s. 0d., delivered Birmingham, £23 10s. 0d., delivered Grangemouth.

Cylinder and Refined Irons.—North Zone, £25 6s. 6d.; South Zone, £25 9s. 0d.

Refined Malleable.—P, 0.10 per cent. max.; North Zone, £26 6s. 6d.; South Zone, £26 9s. 0d.

Hematite.—Si less than 2 per cent, S. & P. over 0.03 to 0.05 per cent., 10-ton lots or over; N.-E. of England (local iron), £23 19s. 0d.; Scotland (Scotch iron), Zone S.1, £24 5s. 6d.; Sheffield, £25 9s. 0d.; Birmingham, £25 13s. 0d.; Wales (Welsh iron), £23 19s. 0d.

Basic Pig-Iron.—£20 3s. 0d., delivered Staffs, Derbyshire, Notts, Lincs, Rutland, Northants, and Leicestershire in 10-ton lots or over.

FERRO-ALLOYS

(per ton unless otherwise stated, delivered)

Ferro-Silicon (6-ton lots and over).—45 per cent. Si, £43 10s. 0d. to £46 0s. 0d., scale 15s. 0d. per unit, lumpy. 75 per cent. Si, £60 0s. 0d. to £63 10s. 0d., scale 15s. 0d. per unit, lumpy.

Ferro-vanadium.—50/60 per cent., 22s. 6d. per lb. of V.

Ferro-molybdenum.—65/70 per cent., carbon-free, 12s. 10d per lb. of Mo.

Ferro-titanium.—20/25 per cent., 2-3 per cent. Cu, £250 0s. 0d.; 38/40 per cent., commercially carbon-free, £287 0s. 0d.

Ferro-tungsten.—80/85 per cent., 11s. 6d. per lb. of W.

Tungsten Metal Powder.—98/99 per cent., 14s. 6d. per lb. of W.

Ferro-chrome (6-ton lots and over, lumpy).—4/6 per cent. C, £81 10s. 0d. to £84 10s. 0d., basis 60 per cent. Cr scale 27s. 0d. to 28s. 6d. per unit; over 6 per cent. C, £79 0s. 0d. to £82 10s. 0d., basis 60 per cent. Cr, scale, 27s. 0d. to 28s. 6d. per unit; 2 per cent. C,* 1s. 8d. to 1s. 11d. per lb. Cr; 1 per cent. C,* 1s. 8d. to 1s. 11¼d. per lb. Cr; 0.15 per cent. C,* 1s. 9¼d. to 2s. 0¼d. per lb. Cr; 0.10 per cent. C,* 1s. 9¾d. to 2s. 0¾d. per lb. Cr; 0.06 per cent. C,* 1s. 11d. to 2s. 1d. per lb. Cr.

Metallic Chromium.—98/99 per cent., 6s. 10d. per lb.

Metallic Manganese.—94/96 per cent., carbon-free, £275 0s. 0d.; 96/98 per cent., £285 0s. 0d.

Ferro-columbium.—65/67 per cent., Cb + Ta, 19s. 9d. per lb., Cb + Ta.

Ferro-manganese (Standard).—78 per cent., £61 10s. 0d.

SEMI-FINISHED STEEL

Re-rolling Billets, Blooms, and Slabs.—BASIC: Soft u.t., 100 tons & over, £31 15s. 6d.; tested, 0.08 to 0.33 per cent. C, 100 tons & over, £32 5s. 6d.; hard (0.41 to 0.60 per cent. C), 50 tons and over, £33 17s. 0d.; silico-manganese, 50 tons and over, £42 16s. 6d.; free-cutting, 50 tons and over, £35 4s. 6d. SIEMENS MARTIN ACID (50 tons and over): Up to 0.25 per cent. C, £40 11s. 0d.; silico-manganese, £43 4s. 0d.

Billets, Blooms, and Slabs for Forging and for Stamping (50 tons and over).—BASIC: Soft, up to 0.33 per cent. C, £37 0s. 0d.; basic, hard, over 0.41 up to 0.60 per cent. C, £38 2s. 6d.; acid, up to 0.25 per cent. C, £41 14s. 0d.

* Average 68-70 per cent.

FINISHED STEEL

Heavy Plates and Sections (50 tons and over).—Ship plate (N.-E. Coast), £40 7s. 0d.; boiler plates (N.-E. Coast), £42 17s. 0d.; floor plates (N.-E. Coast), £41 16s. 0d.; angles (N.-E. Coast), £38 1s. 6d.; joists (N.-E. Coast), £37 17s. 6d.

Small Bars, Sheets, etc.—Rounds and squares, under 3 in., and flats 5 in. wide and under, untested soft basic, 50 tons and over, £39 1s. 0d.; under 10 tons to 4 tons, £40 18s. 6d.; under 4 tons to 2 tons, £41 3s. 6d.; hoop and strip, coils, 100 tons and over, £38 0s. 0d.; uncoated strip mill coils, hot rolled, under 3 mm. to 12g., 25 tons to under 50 tons, £43 16s. 0d.; black sheets (hand mill), 24g., 10 tons and over, £57 14s. 6d.; galvanized corrugated sheets, 24g., 10 tons and over, £67 18s. 0d.

Alloy Steel Bars.—1 in. dia. and up: Nickel, £86 7s. 0d.; nickel-chrome, £97 1s. 0d.; nickel-chrome-molybdenum, £109 14s. 0d., in lots of 25 tons and over.

NON-FERROUS METALS

Copper.—Cash, £218 5s. 0d. to £218 10s. 0d.; three months, £219 5s. 0d. to £219 10s. 0d.; settlement, £218 10s. 0d.

Copper, Tubes, etc.—Solid-drawn tubes, 2s. 1½d. per lb.; rods, 243s. 6d. per cwt. basis; 20 s.w.g., 278s. 6d. per cwt.

Tin.—Cash, £781 10s. 0d. to £782 0s. 0d.; three months, £784 0s. 0d. to £784 10s. 0d.; settlement, £782 0s. 0d.

Lead (Refined Pig).—First half January, £63 5s. 0d. to £63 7s. 6d.; first half April, £64 10s. 0d. to £64 12s. 6d.; settlement, £63 7s. 6d.

Zinc.—First half January, £77 17s. 6d. to £78 0s. 0d.; first half April, £76 15s. 0d. to £77 10s. 0d.; settlement £88 0s. 0d.

Zinc Sheets, etc.—Sheets, 15g., and thicker, all English destinations, £116 0s. 0d.; rolled zinc (boiler plates), all English destinations, £114 5s. 0d.; zinc oxide (Red Seal) d/d buyers' premises, £95 0s. 0d.

Brass Tubes, etc.—Solid-drawn tubes, 1s. 9½d. per lb.; sheets to 10 w.g., 197s. 9d. per cwt.; wire, 2s. 8d.; rolled metal, 197s. 9d. per cwt.

Brass (Brazing).—BS1400, B3, £170; B6, £218.

Brass (High Tensile).—BS1400, HTB1, £191; HTB2 £207; HTB3, £227.

Gunmetal.—BS1400, LG2, £210; LG3, £220; G1, 1%, £284; G1, 1%, £273.

Phosphor Bronze.—BS1400, PB1 (AID released), £299; BS1400, 90/10/1, £288.

Leaded Phosphor Bronze.—BS1400, LPB1, £233.

Phosphor Bronze Strip, etc.—Strip, 283s. 0d. per cwt.; wire, 4s. 0½d. per lb.; rods, 3s. 3½d.; tubes, 3s. 3½d.; chill cast bars, solids 3s. 2¾d.; cored 3s. 3¾d. (CHARLES CLIFFORD LIMITED).

Nickel Silver, etc.—Rolled metal, 3 in. to 9 in. wide × 0.056, 3s. 10½d. per lb.; round wire, 10g. in coils (10 per cent.), 4s. 3½d.; special quality turning rod, 10 per cent., ½ in. dia., in straight lengths, 4s. 2½d. All prices are net.

Other Metals.—Magnesium, ingots, 2s. 2½d. to 2s. 3d. per lb.; Antimony, English, 99 per cent., £210 0s. 0d. Quicksilver, ex-warehouse, £69 0s. 0d. Nickel, £600 0s. 0d. Aluminium, ingots, £186 0s. 0d.; aluminium bronze (BS1400), AB1, £238; AB2, £246.

Catalogues

Refractories. A beautifully-produced catalogue has been issued by J. & J. Dyson, Limited, Griffs Works, Stannington, near Sheffield—a firm now 150 years old. In the main, the catalogue deals with steelworks casting-pit refractories and special firebrick shapes. Earlier publications of the company deal specifically with steelfoundry requirements, but the catalogue under review also covers ladle bricks, nozzles and stoppers for bottom-pouring ladles and cupola bricks. The major part of the brochure, however, is devoted to the refractories used for the bottom pouring of steel ingots. The firm is to be congratulated on the attainment of its sesqui-centenary and the production of this brochure which is in support of this event.

Fume and Dust Removal. Publication No. 180, carrying the title Holmes-Schneible Multi-wash System, issued by W. C. Holmes & Company, Limited, P.O. Box B7, Turnbridge, Huddersfield, uses a series of very clear diagrams to show just how the system operates. A technical description includes a table, giving the overall dimensions, and a picture of a foundry installation completes this section. Louvred exhaust hoods are then described and illustrated with views taken in a mechanized foundry. De-watering plant is also covered, and the final paragraph makes brief reference to cupola dust-collections for which subject a special publication (No. 79) is available.

S.-g. Iron Clamps. Wilton Tool Manufacturing Company Inc., Schiller Park, Illinois, USA, have recently issued catalogue No. 707 promoting series "500," "600" and "900" C-clamps in spheroidal-graphite cast iron. The catalogue states that s.-g. iron castings have strength closely approaching that of forged steel—but are more economical to produce—and stresses the ability of s.-g. iron castings to withstand tremendous forces and to stretch (not crack) when overloaded. Illustrated in the publication is a flat test-bar twisted through six revolutions without cracking.

Titanium and Corrosion Publication No. 3 is one of a series of brochures issued by the Metals Division of the Imperial Chemical Industries, Limited, P.O. Box 216, Birmingham, 6, and deals with wrought titanium. The brochure largely consists of three tables giving the rating at various temperatures of the resistance of titanium to a very large number of chemical reagents and waters. Where the metal is not suitable for a particular duty, this fact is clearly indicated.

Volumetric and Lampblown Glassware. Griffin & George, Limited, Ealing Road, Alperton, Wembley, Middx., have issued a price list of their volumetric and lampblown glassware. The catalogue (P.2121) comprises some 60 pages and is profusely illustrated with a wide range of "Griffin" and "E-Mil" glassware, including burettes, flasks, pipettes, butyrometers, soxhlet extractors and viscometers.

Basin Tilter. In a *News Bulletin* issued by the Morgan Crucible Company, Limited, Norton Works, Woodbury Lane, Worcester, an excellent illustrated description is given of the company's "1300" basin tilting furnace which has been specially developed for use where large quantities of molten aluminium are required. The new tilter is the largest yet produced by the Morgan concern.

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New Patents

(Copies of complete specifications are obtainable from the Patent Office, Sales Branch, 25, Southampton Buildings, Chancery Lane, London, W.C.2, price 3s. 6d.)

825,956. Belling and Lee, Limited, Gt. Cambridge Road, Enfield, Middx.

Die-cast fitment for television or other high-frequency aerials.

826,122. Birmidal Developments, Limited, Woodgate Works, Clapgate Lane, Quinton, Birmingham, 32.

An improved method and apparatus for the manufacture of shell moulds or hollow thin-walled foundry cores.

826,304. Gustav Zimmermann Maschinenfabrik, G.m.b.H., Düsseldorf-Rath, Germany.

Apparatus which influences the rocking movements of machine parts, especially in foundry machines, for example the rocking movement of the turnover arm in moulding machines, or of the counter-pressing spar of such machines.

826,340. Dow Chemical Company, Midland, Michigan, USA.

Method and apparatus for casting a metal object with a passageway of generally uniform cross-section, but having a devious course in the object. A fusible metallic mandrel is covered with a sleeve of woven fibres (*e.g.* ceramic—soda-lime glass or borosilicate glass). This sleeve diametrically contracts, being subjected to lengthwise stretching. The sleeve is coated with a refractory mould-wash comprising, for example, a clay and zirconium silicate to cement together the fibres of the sleeve. The mandrel is then melted out.

826,401. Arthur Abbey, 111/112 Hatton Garden, London, E.C.1, a communication from Sutter Products Company, 2005 Westwood Avenue, Dearborn, Michigan, USA.

Improvements in machines for manufacturing foundry moulds and cores, particularly for use in shell-moulding processes. (See also B.P. 794,903, FOUNDRY TRADE JOURNAL, July 24, 1958.)

826,609. A. B. Svenska, Kullugarfabrikenj, 17 Artillerigaten, Goteborg, Sweden.

This invention is for improvements in, or relating to, ingot moulds and is particularly concerned with hot-tops for ingot moulds for making killed-steel ingots, *i.e.* ingots from steel which has been deoxidized before casting. A machine applicable to this process is claimed in B.P. 826,610.

826,632/3. Birmidal Developments, Limited, Woodgate Works, Clapgate Lane, Birmingham, 32.

Multi-station machines for making foundry moulds and cores are claimed in the first of these two Patents. The co-patent, B.P. 826,633, deals specifically with the indexing mechanisms for such machines.

826,775. Foundry Services, Limited, Long Acre, Nechells, Birmingham, 7.

Processes and apparatus for the production of multi-layer products in which each layer is formed of compacted granular material. It is claimed to be of particular value for sleeves used as linings, for hot-top boxes and heads of ingot moulds.

826,893. Motoren-Werke Mannheim, A.G., Vorm-Benz Abt. Stat. Motorenbau, Carl-Benz-Strasse, Mannheim, Germany.

Means for effecting a seal between a heavy-metal cylinder of an engine and its associated light-metal cylinder-head with especial reference to air-cooled diesel engines. The heavy-metal ring is cast into the cylinder-head in such a way that it surrounds an inner cylinder-head rim. This ensures that in operation the ring and the surrounding light-metal cylinder are firmly pressed against one another, as a result of the differential heat expansion. There will thus be no opportunity for carbon residues to form between the engaging surfaces of the ring and the cylinder-head.

827,262. S.A. Metallurgique D'Esperance-Longdoz, 1 rue Armand Stouls, Liège, Belgium.

Continuous centrifugal casting of metals with especial reference to the casting of steel—the casting being effected either by means of an exterior mould or preferably between two concentric moulds. This invention may be used particularly in the process claimed in the company's co-patent, B.P. 817,847 (FOUNDRY TRADE JOURNAL, October 20, 1960).

827,770. United Kingdom Atomic Energy Authority, London.

The objective of this invention is to provide furnaces equipped with induction heating from an a.c. energized coil, which can operate at high frequencies without suffering from glow discharge difficulties.

827,828. Mannesmann A.G., Mannesmannufer 1b, Düsseldorf, Germany.

Improvements in or relating to processes for increasing casting output in continuous-casting installations, of the type described and claimed in B.P. 762,971 (JOURNAL, January 31, 1957). The objective of this present Patent is to modify the previous one and make it possible to produce a casting having a plain surface in spite of using a mould with a corrugated internal surface.

827,888. Foundry Services, Limited, Long Acre, Nechells, Birmingham, 7.

This Patent refers to the production of ingots and more especially to improved means of removing ingots from moulds in which they are cast. When the ingot has practically solidified, a metal bar is welded to, or embedded in, the head of the ingot. Thus the ingot can be easily lifted from the mould with tongs.

827,939. Herman Pneumatic Machine Company, Union Bank Building, Pittsburgh, Penn., USA.

Centrifugal-casting apparatus and a method of clearing a rotating flask having a radially enlarged zone at one end adapted to take a mould of compacted mould-forming material having a portion in the enlarged zone of the flask. (See also B.P. 650,683.)

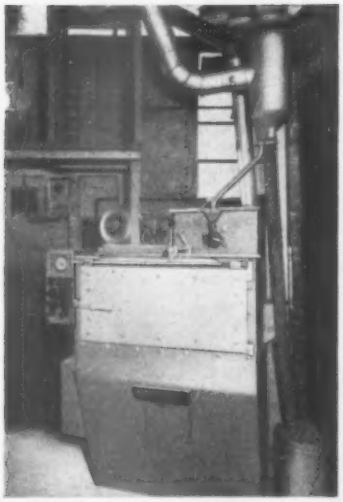
828,037. General Electric Company, 1 River Road, Schenectady 5, New York, USA.

A rubbing seal for gas-turbine engines and a method of forming and bonding rubbing material (usually silver or silver-alloy) on to a stainless-steel backing ring.

828,040. General Motors Corporation, Grand Boulevard, Detroit, Michigan, USA.

A mould assembly for casting linings of cylindrical articles, particularly bearings formed of lining material on a backing member. A 20 per cent. increase in the rate of production of finished bearings is claimed by the application of this invention.

HARLAND ENGINEERING COMPANY, LIMITED—Mr. A. C. Wood-Parker, has been appointed a director.



Baker Perkins Foundry Machinery at work ... *at the Southend Engineering Co. Ltd.*

This Baker Perkins Girojet Universal Shot Blasting Machine operates without compressed air, needs negligible maintenance and costs little to run. And here's another advantage—no foundations are needed. The Girojet will take an evenly distributed load of 500 lbs. Average shotblasting times: aluminium (2-4 minutes); grey iron (3-6 minutes); malleable cast iron or bronze (4.5-8 minutes); forged steel or stamped steel (10-20 minutes).

This is the machine that completely replaces the hand cabinet.

Please write for full details today.

Baker Perkins Ltd. ENGINEERS

Bedewell Division, Hebburn-on-Tyne, Co. Durham
Telephone: Jarrow 897124

HISTORICAL NOTE

Southend Engineering Company was established in 1901, and manufactured Marine and Stationary engines until 1914. The Firm has produced its own non-ferrous castings since 1938. They manufacture the "Viking 3" Outboard Motor, a set of flame guns for agricultural purposes, and a range of Stern Gear and fittings for marine engine manufacturers.

BP/F10
F2

Imports and Exports of Iron and Steel in November

The following tables, based on Board of Trade returns give figures of imports and exports of iron and steel in November last year. Totals for the first eleven months of 1959 and 1960 are also included.

Total Exports of Iron and Steel

Destination.	Month ended Nov. 30.	Eleven months ended November 30.	
	1960.	1959.	1960.
	Tons.	Tons.	Tons.
Cyprus	412	1,523	1,854
Sierra Leone	1,202	8,718	7,300
Ghana	1,216	24,058	20,229
Nigeria	3,561	67,894	54,029
Union of South Africa	7,744	38,316	62,696
Rhodesia and Nyasaland	2,650	19,371	25,468
Tanganyika	1,670	17,808	14,426
Kenya	2,601	23,783	27,221
Uganda	142	3,905	1,411
Mauritius	115	1,599	4,183
Aden	133	2,833	2,509
Bahrein, Qatar, and Trucial States	1,112	7,769	13,515
Kuwait	256	9,528	5,624
India	19,284	191,676	232,573
Pakistan	2,383	41,106	57,692
Singapore	3,719	20,872	21,330
Malaya	1,477	9,573	16,886
Ceylon	2,506	34,124	46,071
British North Borneo	215	2,510	4,067
Hongkong	6,584	62,137	75,815
Australia	29,508	78,734	179,039
New Zealand	24,186	94,152	126,563
Canada	11,537	215,097	188,720
Jamaica	2,737	19,945	22,791
Trinidad	2,540	37,060	35,389
British Guiana	588	6,085	8,114
Other Commonwealth countries	1,967	33,970	30,115
Eire	5,705	45,279	57,554
Soviet Union	2,819	29,713	27,122
Finland	5,867	34,385	46,293
Sweden	12,158	117,625	157,705
Norway	13,418	89,277	111,085
Denmark	7,650	87,288	90,260
Western Germany	6,616	108,377	123,285
Netherlands	9,985	93,093	110,017
Belgium	1,282	33,082	29,513
France	2,037	5,285	9,141
Switzerland	1,059	7,882	13,108
Portugal	1,157	13,863	14,773
Spain	1,522	24,700	41,821
Italy	4,958	42,409	41,141
Austria	404	4,263	4,708
Yugoslavia	2,343	5,168	34,682
Greece	1,308	9,964	18,360
Turkey	2,232	4,746	19,743
Netherlands Antilles	305	3,091	3,119
Portuguese East Africa	246	1,368	4,052
Egypt	1,078	6,148	12,956
Sudan	735	6,508	8,793
Lebanon	212	3,270	1,912
Israel	1,232	12,774	17,558
Saudi Arabia	150	3,000	525
Iraq	13,645	73,084	51,472
Iran	10,095	36,086	70,199
Burma	252	8,062	5,213
Thailand	471	7,375	5,965
Indonesia	1,508	8,315	22,010
China	4,894	50,811	50,613
Japan	13,601	104,674	71,964
Philippine Republic	115	8,142	6,546
USA	10,614	180,552	181,974
Cuba	35	7,407	6,659
Colombia	903	4,903	8,777
Venezuela	7,791	61,460	37,874
Ecuador	290	896	2,769
Peru	749	2,725	6,070
Chile	207	1,363	3,810
Brazil	1,364	21,830	24,730
Uruguay	890	1,745	6,475
Argentina	7,048	184,528	79,165
Other foreign countries	6 153	85,142	123,617
TOTAL	299,152	2,775,804	3,052 698

Total Imports of Iron and Steel

From	Month ended Nov. 30.	Eleven months ended November 30.	
	1960.	1959.	1960.
	Tons.	Tons.	Tons.
Union of South Africa	2,362	26,131	28,003
Rhodesia and Nyasaland	4,690	4,884	11,296
Canada	28,233	18,143	247,944
Other Commonwealth countries and Eire	6,238	12,389	49,849
Soviet Union	480	59,830	28,076
Sweden	5,776	27,840	46,902
Norway	15,928	81,359	145,845
Poland	215	4,673	8,860
Western Germany	5,480	70,188	119,336
Netherlands	13,682	151,380	181,916
Belgium	11,586	20,475	108,824
Luxembourg	1,006	6,223	14,430
France	3,076	22,029	61,242
Italy	73	12,334	21,601
Austria	47	3,778	10,379
Japan	697	2,237	6,636
U.S.A.	10,596	23,284	333,406
Other foreign countries	16,967	11,349	150,145
TOTAL	127,132	558,526	1,574,490
Iron and steel scrap and waste, fit only for the recovery of metal	2,870	2,677	223,971

Exports of Iron and Steel, by Product

Product.	Month ended Nov. 30.	Eleven months ended November 30.	
	1960.	1959.	1960.
	Tons.	Tons.	Tons.
Pig-iron	7,681	125,878	136,131
Ferro-columbium (niobium)	7	62	96
Ferro-tungsten	199	1,119	984
Other ferro-alloys	1,771	9,002	11,117
Ingots, blooms, billets, slabs, sheet bars (incl. tinplate bars), and similar primary forms	190	74,748	22,214
Pieces roughly shaped by forging	61	1,334	847
Iron bars, rods, angles, shapes, and sections	327	3,323	1,686
Steel bars, rods, angles, sections, and shapes	63,926	476,785	572,750
Iron plates and sheets	38	1,642	566
Universal plates	3,121	8,758	20,157
Steel plate, 3 mm. and under 4.5 mm. thickness	3,121	37,049	35,280
Ditto, 4.5 mm. or more in thickness	30,124	197,160	317,094
Blacksheets and blackplate	21,492	259,182	269,806
Hoop and strip	10,614	76,030	95,293
Tinplate	43,126	423,177	457,083
Decorated tinplate	444	7,628	5,716
Galvanized sheets	7,325	76,982	76,347
Other (incl. tinned sheets, terneplate, and ternesheets)	3,070	19,842	26,555
Railway and tramway construction material	16,184	153,642	160,737
Wire rods of steel (incl. alloy steel)	5.333	45.428	50.998
Wire	12.436	99.685	111.107
Tubes, pipes and fittings	08,562	677,348	680,134
TOTAL	299,152	2,775,804	3,052,698

THIS YEAR'S annual congress of the German Foundrymen's Technical Association is to be held in Düsseldorf on October 5 and 6.

DAMAGE ESTIMATED AT £100,000 was caused by fire at the warehouse of Furse Wholesale, Limited, Traffic Street, Nottingham, on December 23. Stocks of cookers and refrigerators were lost. The blaze was fought by 50 firemen and 12 appliances for three hours.

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AND

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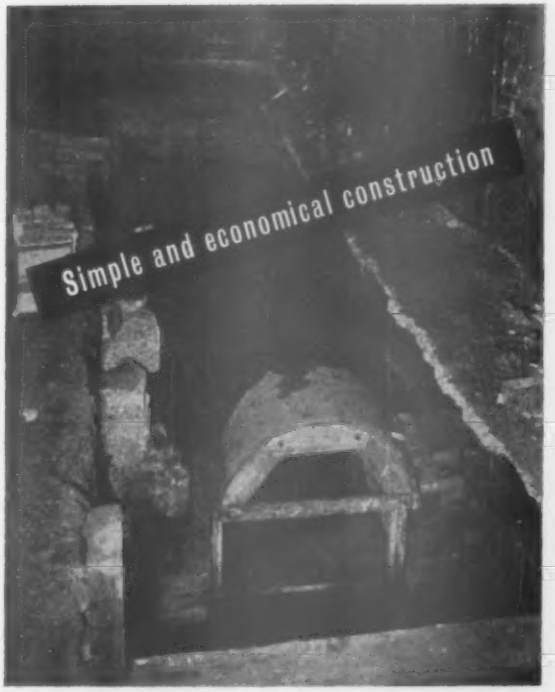

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CLASSIFIED ADVERTISEMENTS

PREPAID RATES: **Twenty words for 10 – (minimum charge) and 4d. per word thereafter. Box numbers 2/6 extra per insertion (including postage of replies). Situations wanted 2d. per word throughout.**

Advertisements (accompanied by a remittance) and replies to Box Numbers should be addressed to the Advertisement Manager, Foundry Trade Journal, John Adam House, 17/19, John Adam Street, Adelphi, London, W.C.2. If received by first post Monday advertisements can normally be accommodated in the following Thursday's issue.

SITUATIONS WANTED

FOUNDRY FOREMAN (36), Higher National Certificate, City & Guilds Diploma, seeks position with improved prospects. Skilled in all aspects of iron founding. Salary £1,150—£1,500. Box FF535, FOUNDRY TRADE JOURNAL.

FOUNDRY MANAGER, 43, with technical ability and a wide practical knowledge in all aspects of the Foundry trade, technical liaison, estimating, plant layout and purchasing, etc. Willing to travel anywhere. Box FM539, FOUNDRY TRADE JOURNAL.

FOUNDRY MANAGER, having ideal practical, technical and commercial experience, seeks opportunity to control small to medium size jobbing foundry. A time served moulder with good record in management. Cost-conscious and with modern outlook. Personal contacts and selling experience could bring new work. Box FM534, FOUNDRY TRADE JOURNAL.

FOUNDRY TECHNOLOGIST (28). National Foundry College Diploma, City and Guilds Foundry Practice. Patternmaking apprenticeship, desires progressive position in London area or Southern England. Experienced in light and medium grey iron, mechanised and jobbing work, including CO_2. Box FT544, FOUNDRY TRADE JOURNAL.

SITUATIONS VACANT

METALLURGIST (young qualified) required for Investment Casting Foundry in Midlands. Experience of steel investment casting essential. Good prospects and salary. Write, giving full details of age, qualifications, previous posts held, etc., to Box MY567, FOUNDRY TRADE JOURNAL.

PATTERNMAKERS (wood and metal) required. Excellent wages and plenty of overtime. Permanent positions. STANDARD PATTERN CO. LTD., 26A Broadwall, Stamford St., S.E.1. WAT 6875.

SERVICE ENGINEER required by well known Foundry Equipment Manufacturers. Preference given to applicants residing in the South West Midlands or Birmingham-Coventry area. Non-contributory pension scheme. Write stating age and full details of past experience to Box ER527, FOUNDRY TRADE JOURNAL.

FOUNDRYMAN required by old established Engineering firm in East Anglia; pleasantly situated in small country town within a few miles of the sea. The successful applicant will be required to take control of the Iron Foundry and to be responsible for estimating, fixing piece work prices, quality of metal and production. Please apply in writing, quoting age, experience and salary required, to the ASSISTANT GENERAL MANAGER, Box FR537, FOUNDRY TRADE JOURNAL.

SITUATIONS VACANT—*contd.*

GENERAL MANAGER required for old established Iron Foundry producing high quality repetition castings. Good salary will be paid to man with vision and sound practical and technical experience. The foundry is almost fully mechanised and capable of producing 250 tons of castings weekly. Box GM530, FOUNDRY TRADE JOURNAL.

PATTERN MAKERS required for small Master Shop situated in the pleasant City of Rochester, 50 minutes from London, 30 minutes Kentish Coast. Good wages according to ability. CHARLES MANN & SONS, Ross Street, Rochester.

Advertisers whose announcements appear under a box number are urged to acknowledge, however briefly and informally, all replies received. This particularly applies to advertisements under "Situations Vacant"; serious inconvenience and, sometimes, real hardship can be caused to applicants who receive no indication even of the safe receipt of their communication. Failure to acknowledge replies can also reflect on the good faith of this journal, which is responsible for their onward transmission. If it is desired to maintain anonymity, an acknowledgement on plain paper, quoting the relevant box number, is all that is necessary.

SITUATIONS VACANT—*contd.*

DRAUGHTSMAN ESTIMATOR/PLANNING ENGINEER with experience of Aluminium and Zinc Pressure Die-casting required by progressive Company in North-West London. Permanent monthly staff appointment and Pension Scheme. Substantial salary to a fully-qualified man. Apply in writing, giving details of education, experience, etc., to the PATENT DIE-CASTINGS CO. LTD., 52 Strode Road, London, N.W.10.

REPRESENTATIVE REQUIRED, preferably man already calling on Foundries in the Midlands and the South. Must be experienced in Foundry practice and techniques, and be able to advise customers on the use of Studs and Chaplets. Good opening for a man with the right experience. Write, giving full details to Box RR542, FOUNDRY TRADE JOURNAL.

IRONFOUNDERS manufacturing Domestic Appliances (Manchester area) offer opportunity to keen young foundryman starting as ASSISTANT to Foundry Foreman for further training to managerial level. Applications, stating age and giving full details of experience to date, should be addressed to Box IM543, FOUNDRY TRADE JOURNAL.

FOUNDRY FOREMAN, age 30-45, required by expanding Iron Foundry in East Lancashire. Applicants should have sound technical and practical foundry experience, coupled with first rate supervisory ability, drive, and initiative. Prospects excellent. An attractive salary and pension scheme offered to successful applicant. Write giving full personal details and experience to Box FF540, FOUNDRY TRADE JOURNAL.

AEI

FOUNDRY SUPERINTENDENT

FOR SOUTH AFRICA

Applications are invited from persons aged 35 to 45 to fill the above position at a large Production Foundry situated near Johannesburg.

A wide experience in modern Blackheart Malleable and Grey Iron foundry practice and general administration is essential. Experience in the manufacture of pipe fittings and automobile castings will be a strong recommendation.

The position offers excellent prospects to a man with the requisite experience and organising ability.

Apply in writing to:—

The Secretary,
c/o Associated Electrical Industries
Overseas Limited,
33, Grosvenor Place, London, S.W.1

SITUATIONS VACANT—*contd.*

FOUNDRY FOREMAN

YOUNG MAN, preferably with National Foundry College Diploma, required by Thomas Potterton Ltd. (De La Rue Group). Should be experienced in all aspects of modern foundry practice. The Company is in the forefront of an expanding industry (central heating) and prospects and conditions of employment are excellent. Please write, giving details of age, experience and salary required, to PERSONNEL OFFICER, Thomas Potterton Ltd., Emscote Road, Warwick.

IRON FOUNDRY in North East Midlands specialising in Machine Tool and Pressure Type Castings require working CORE SHOP FOREMAN to take charge of and work with approximately six Coremakers. Salary about £900 per annum. Apply stating experience to Box IF538, FOUNDRY TRADE JOURNAL.

EDGAR ALLEN
& CO. LIMITED · SHEFFIELD

who produce Steel Castings from a few pounds to 20 tons in weight in a wide range of qualities invite applications for the post of

MOULDING SHOP MANAGER

who will be responsible to the Foundry Manager.
Applicants, between the ages of 35 and 50, must have a thorough practical knowledge of pattern-making, foundry sands, and of high-grade machine and floor mould production.
Applicants should be energetic men of high ability who are abreast of developments in foundry techniques and modern methods of management, technical and supervisory.
Salary envisaged is about £2,000 a year for a man of the required knowledge and ability.
Applications giving full details of qualifications and experience to **The Secretary, Edgar Allen & Co. Ltd., Imperial Steel Works, Tinsley, Sheffield 9.**

SITUATIONS VACANT—*contd.*

SAND TECHNICIAN required for heavy Iron Foundry in South Wales. Good working knowledge of naturally bonded and CO, Sands and Air Setting Core Oils. G.C.E. in Science subjects. Age 25/35. Staff Position. Contributory Pension Scheme. Apply in writing to the "PERSONNEL OFFICER," Guest Keen Iron & Steel Co., Ltd., Ivor Works, Dowlais, Merthyr Tydfil.

A FOUNDRY TECHNICIAN is required for a medium sized Foundry. Applicants should be between the ages of 30 and 35 years; they must have had a good basic technical training and experience in the production of superior quality grey iron and Blackheart Malleable Iron Castings in a mechanised foundry. Experience in the production of chilled Grey Iron Castings would be an advantage. The prospects for a reliable, energetic and capable man are very good. Salary will be in accordance with capability and experience. House can be made available if necessary. Applications, which will be treated in confidence, should be addressed to THE TECHNICAL DIRECTOR, Shanks Ironfounders Ltd., Dens Iron Works, Arbroath.

SENIOR FOREMAN required for large Non-ferrous Foundry in Home Counties, manufacturing wide range of Bronze and Light Alloy Castings. Must have experience in production of heavy Bronze and Gunmetal Castings by machine and floor moulding methods. Good salary. House available. Box SF536, FOUNDRY TRADE JOURNAL.

METALLURGIST required for Grey Iron Foundry in the Birmingham area to control cupolas, metal and sand mixes in medium sized foundries producing castings for the machine tool industry. Salary in accordance with qualifications and experience. Write full details of experience and present salary. Age 35 to 40 preferred. Box MR535, FOUNDRY TRADE JOURNAL.

APPLICATIONS are invited from persons with suitable experience or technical qualifications to be responsible for Quality Control activities in a Foundry producing steel and high alloy castings by the Lost Wax and Shell Moulding techniques. The successful applicant will be expected to exercise his ingenuity in developing new techniques and improved methods of manufacture. Applications with full details of education, qualifications and experience to be sent in confidence to the PERSONNEL MANAGER, HADFIELDS LTD., East Hecla Works, Vulcan Road, Sheffield, 9. This is a repeat advertisement. Applications received in response to the previous advertisement will receive further consideration.

MACHINERY WANTED

WANTED.—"Wadkin" Pattern Miller, "LQ" Recessor, Disc and Bobbin Sander, Dimension Sawbench, Spindle Moulder. Good prices paid for modern machines. "LONG MEADOW," Manor Lane, Whatton, Notts.

SECOND HAND Polygram Vacuum Mould Closer wanted. Box SH541, FOUNDRY TRADE JOURNAL.

WANTED. Good light alloy furnace up to 500 lb. brass. Any type considered. Box WG545, FOUNDRY TRADE JOURNAL.

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comprising :—
Two 3 ton capacity Cupolas,
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Can be inspected in situ and is available at an attractive price loaded on to vehicle.

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Large stock of Geared Ladles up to 8-tons capacity.
Several Roper Ladles and Roper Ladle Hoists.
British Moulding Machine size A.T.3.
Morris Screenerator. Nearly new.
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Pneulec 5 cwt. Capacity Core Sand Mixer, self-discharging motorised A.C.3 phase.
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Please send for illustrated leaflet.
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Jackman Sand Mill, 5ft. diameter.
Four Pneulec Royer sand mixers.
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Large stock of Moulding Boxes up to 24in. square. *Please send for list*

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Telephone: SLOUGH 22877 and 22094.

Foundry Superintendent

for large well-equipped Foundry producing Grey Iron castings, together with small quantities of non-ferrous castings.
Sound knowledge of Foundry technology is essential (sand control, metallurgical analysis, etc.), together with wide practical experience, preferably including shell and core methods.
Applicants must have had supervisory experience at a senior level and be in the 35–40 age group.
Full details of age, qualifications, experience and salary required to:

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The Personnel Manager,
BRITISH NORTHROP LIMITED,
BLACKBURN, LANCS.

Roper
LADLES
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TWW

AIRLESS ROTARY BARREL shot blast machine ("Sand Wizard") by Constructional Eng. Co., size 44 in. × 40 in., complete with elevators, dust extraction plant etc., arranged 400/440/3/50 cycles.
B.M.M. jolt squeeze turnover Moulding Machine, type RDO.
Luke & Spencer 36 in. motorised Duplex Grinder, 380/420 volts, 3 phase, 50 cycles. Spenstead motorised dust extraction cabinet.
Rowland 30 in. motorised Grinder, 400/440/3/50 cycles, at present fitted with 20 in. wheels. Keith Blackman blower, cyclone dust collector.
Luke & Spencer model DHG. 20 in. motorised Duplex Grinder, 400/440/3/50 cycles. Cyclone type dust collector.
30 in. high pressure Sirocco Cupola Blower, 3,340 c.f.m. at 21 in. s.w.g.
Richards Sandmaster portable electric Sand Conditioning Machine.
10/12 Roper hand geared Crane Ladle, oil bath gearing.
15 cwt. Roper hand geared Crane Ladle, oil bath gearing.
Pneulec Sand Rover No. 1, 460 v., 3 phase.
Wide range of air compressors always in stock.
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DAVIES 2 ft. 6 in. dia. × 6 ft. high, 10/12-cwt. cap. with Blower.
Constructional 3 ft. 6 in. dia. × 12 ft., with Blower and Skip Hoist.

FURNACES

Monometer 30-cwt. Oil-fired rotary with Burner, Blower, Control Panel, Recuperator, Exhaust Box and chimney; little used: seen erected.
Lees-Hall 600-lb tilting, with oil burner and Blower.
Morgan C.A. size 6 oil-fired tilting 15-cwt. cap. brass, with Burner, pre-heater, Blower, etc.
Black Seam "Midland Monolithic" approx. 250-lb. cap.
Termic Gas-fired 300-lb. brass cap.
Askham Gas-fired 150-lb. brass cap. with Blower.

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No. 2 "Newstad" Gas-fired Hot Air Unit by Modern Furnaces. Capacity 30,000-c.ft. hot air per hour at 400 deg. C. with self-supporting structure mtd. on heavy castors. As new.

S. C. BILSBY & CO.,
Tipton 2448
31, Hainge Road, Tividale, Staffs.
(Established 40 years).

STERLING Steel Moulding Boxes, as new condition, for sale. 33 in. × 18 in. × 6 in. deep and 10 in. deep. 29½ in. × 33½ in. × 12½ in. deep. Box SS522, FOUNDRY TRADE JOURNAL.

"WADKIN" Model "RS" 8-in. Centre Motorized Gap Bed Woodturning Lathe, travelling slide tool carriage, outside turning. DALTONS, Canal Street, Nottingham.

MACHINERY FOR SALE—*contd.*

NO. 2 PNEULEC ROVER.
Jackman 4 ft. Shot Blasting Cabinet with inbuilt Dust Arrestor. Complete with Compressor.
Jackman 5 ft. Sand Mill.
Jackman 602 Moulding Machines.
Jackman 904 Moulding Machines.
Ladles from 2 cwt. to 5 ton. Geared.
B.M.M. S.F.2 Moulding Machines.
Wallwork WT 562 AX Moulding Machines.
Spermolin Sand Mixer, 2 cwt.
Two Portable Mould Dryers.
Roper 5 cwt. Ladle Hoist.
Several Hand operated Moulding Machines.

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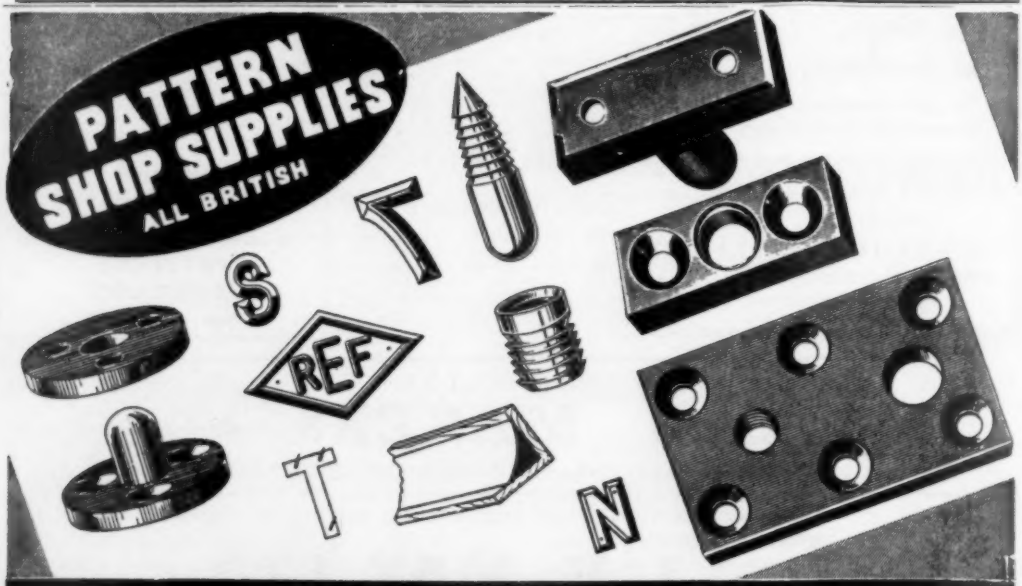

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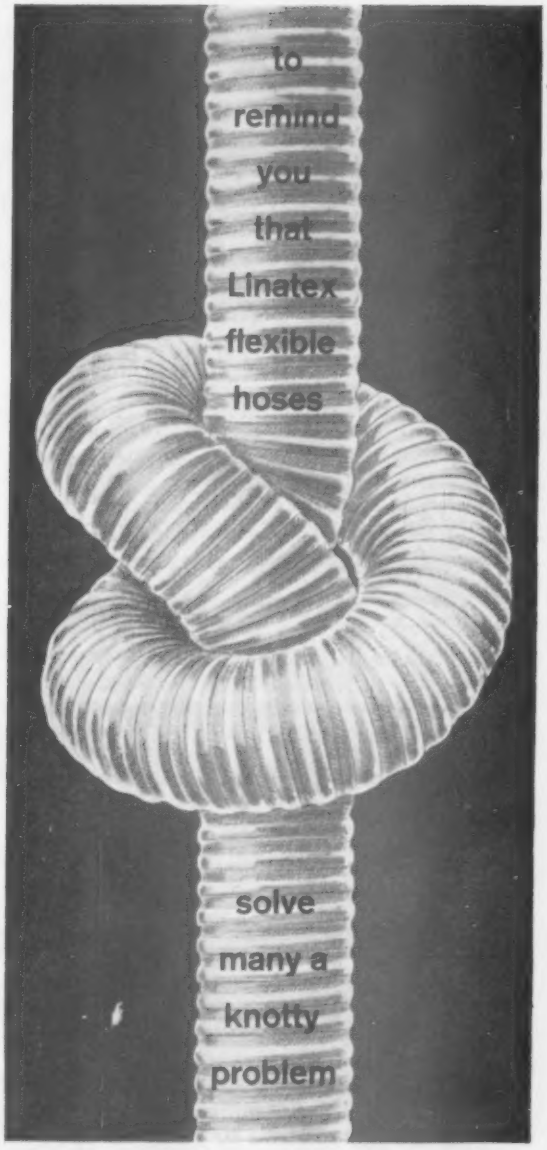

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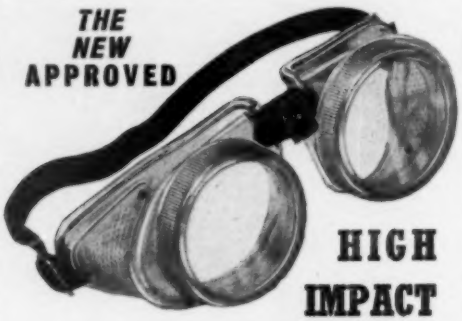

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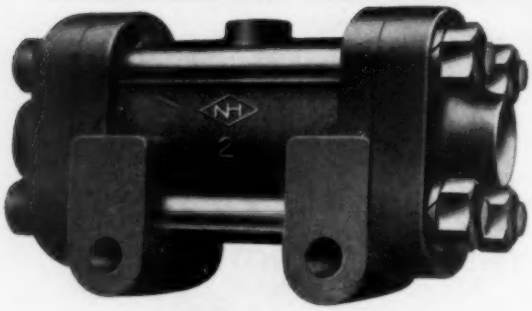

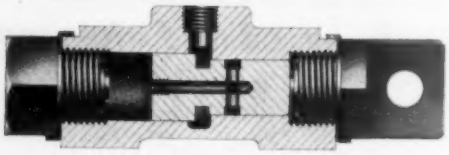

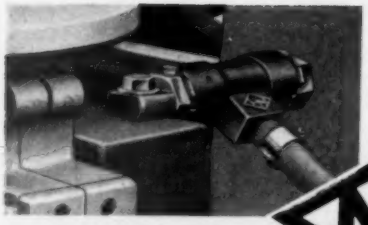

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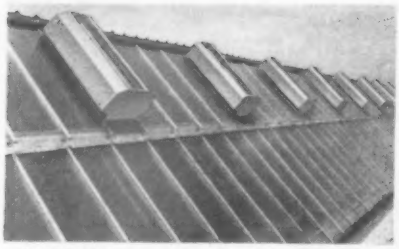

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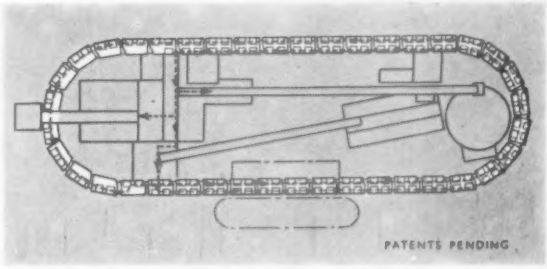

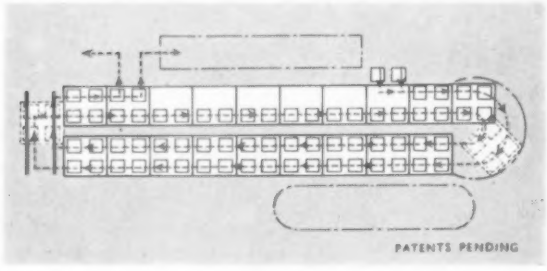

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Rectangular loop, consisting of two straight runs connected with a rotary turn and transfer car. Cars advance one car length, then remain stationary for timed period so large moulds can be loaded onto the conveyor, poured, and the moulds removed, while the conveyor is stationary. Moulds are carried side by side on the cars and make almost two complete trips around the loop, thus nearly doubling the cooling time per square foot of floor space.

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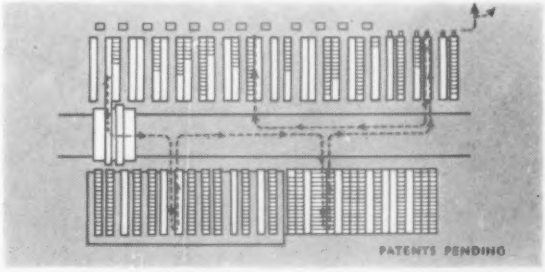

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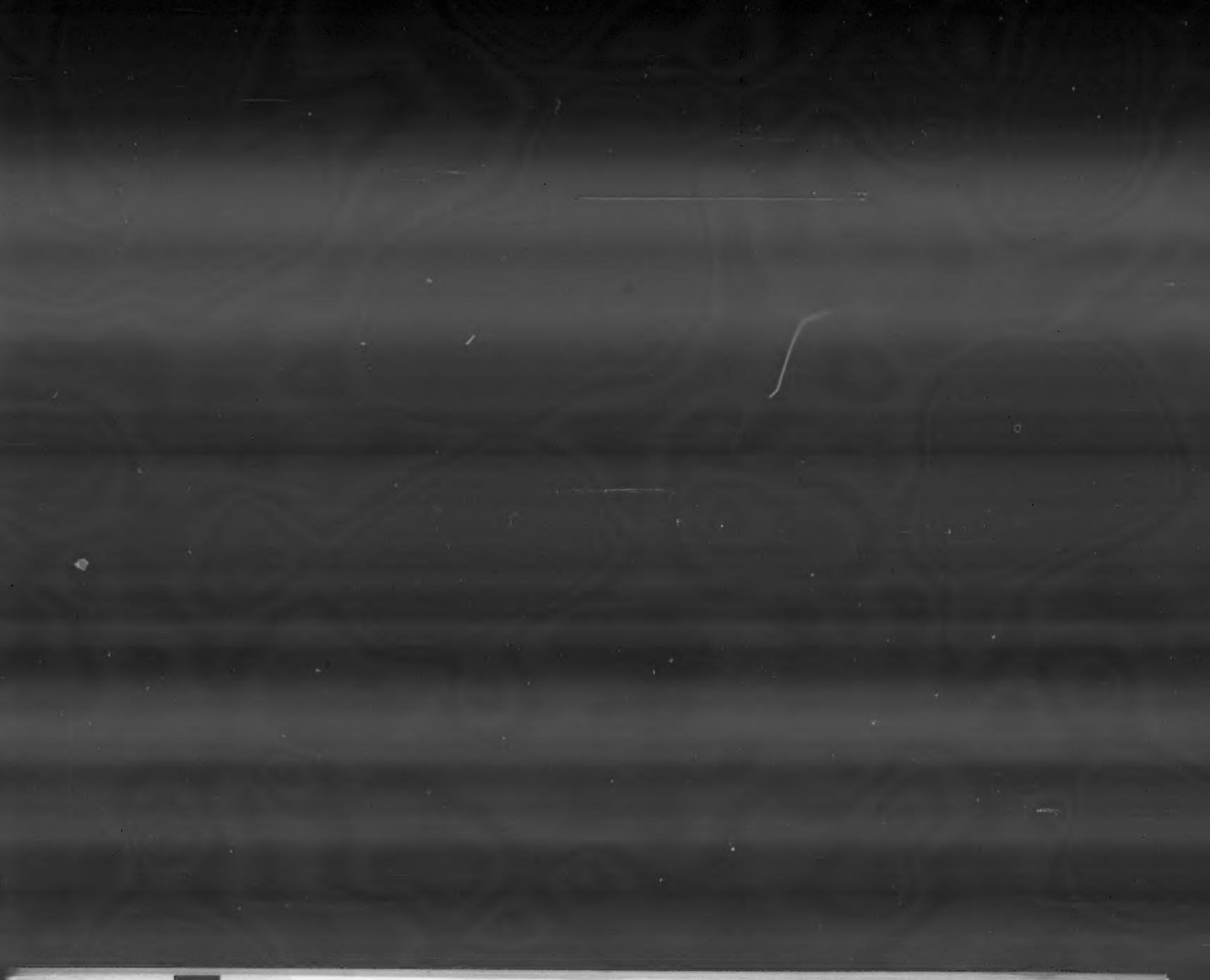
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